



**OCCIDENTAL CHEMICAL CORPORATION**

**Special Environmental Programs  
Niagara Falls, New York**

**Report of Groundwater & Soils Investigation  
at  
The Former Ruco Division Plantsite  
Hicksville, New York**

**Second Round of Sampling**

**February 1986**

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## EXECUTIVE SUMMARY

### 1.1 Hydrogeological Conclusions

1. The directions of ground-water movement are essentially the same as previously reported. Shallow flow is to the south-southwest and flow in the deeper strata is to the south. The water table appears to be affected by off-site water withdrawals.

2. The areal extent of PCB contamination near the pilot plant has mostly been defined, and the depth of contamination has been shown to be limited to the upper few feet of soil. With one exception, the higher levels of PCB's correspond with visually contaminated soil.

3. The second round of ground-water sampling revealed that upgradient Well Cluster A has experienced a degradation of water quality from an upgradient source. With the exception of Well E-1, the downgradient wells have shown an improvement in water quality relative to the first samples.

4. In view of the facts that:

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- an upgradient source or sources of volatile organic solvents has been verified;
- these same volatile organic chemicals have the potential to degrade to vinyl chloride;
- vinyl chloride has been found in a supply well which could not conceivably have been affected by events at the Ruco plant; and
- the affected wells are downgradient from other industrial facilities, as well as parts of the Ruco plant;

it is concluded that there is no definitive evidence to attribute the low levels of organic chemicals observed in the on-site wells entirely to former operations at the facility.

5. If further investigations to fully define the source, extent and ultimate fate of ground-water

contamination are warranted, such investigations would have to be conducted off site to be meaningful.

## 2.0 Analytical Chemistry Conclusions

1. Water samples from twelve locations were analyzed for a variety of parameters. None of the organic parameters analyzed for were found at four locations. Of the remaining locations, four had only one compound, two had two compounds and two had three compounds. Only one value was over 50 ppb and none were over 200 ppb.

2. The results were compared with the results of the 1984 Report. In general, the agreements of ground-water quality parameters were good. Significant decreases in volatile chemical concentrations were good. Significant decreases in volatile chemical concentrations were found in wells C2, D1, F1 and F2. There was a small increase in the concentration of volatile chemicals in wells A1, A2 and E1.

3. The vinyl chloride concentrations in wells F1 and F2 dropped from 140 ppb to 38 ppb and from 50 ppb

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to not detected, respectively. The vinyl chloride concentration in well E1 increased from 7 ppb to 42 ppb.

4. Phthalates were not found in the groundwater. Those present in samples were a result of sample contamination, either in the field or laboratory.

5. The extent of the therminol spill area was further delineated.

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OCCIDENTAL CHEMICAL CORPORATION  
HYDROGEOLOGIC INVESTIGATION  
AT THE FORMER  
RUCO DIVISION PLANTSITE  
HICKSVILLE, NEW YORK

Prepared For  
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February 1986

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CONCLUSIONS

1. The directions of ground-water movement are essentially the same as previously reported. Shallow flow is to the south-southwest and flow in the deeper strata is to the south. The water table appears to be affected by off-site water withdrawals.

2. The areal extent of PCB contamination near the pilot plant has mostly been defined, and the depth of contamination has been shown to be limited to the upper few feet of soil. With one exception the higher levels of PCB's correspond with visually contaminated soil.

3. The second round of ground-water sampling revealed that upgradient Well Cluster A has experienced a degradation of water quality from an upgradient source. With the exception of Well E-1, the downgradient wells have shown an improvement in water quality relative to the first samples.

4. In view of the facts that:

- an upgradient source or sources of volatile organic solvents has been verified;
- these same volatile organic chemicals have the potential to degrade to vinyl chloride;
- vinyl chloride has been found in a supply well which could not conceivably have been affected by events at the Ruco plant; and,

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- the affected wells are downgradient from other industrial facilities, as well as parts of the Ruco plant;  
it is concluded that there is no definitive evidence to attribute the low levels of organic chemicals observed in the on-site wells entirely to former operations at the facility.

5. If further investigations to fully define the source, extent and ultimate fate of ground-water contamination are warranted, such investigations would have to be conducted off site to be meaningful.

#### INTRODUCTION

A hydrogeologic investigation of the former Ruco Division plantsite, conducted between June 20, 1983 and February 16, 1984, resulted in the installation and sampling of 12 wells at six locations. A complete description of the field program is presented in a report entitled "Report of Groundwater and Soils Investigation at the Former Ruco Division Plantsite, Hicksville, New York; Section II, Hydrogeology". The first set of ground-water samples, obtained from January 30 to February 7, 1984, revealed the presence of low concentrations of a few volatile organic chemicals in several wells. In order to verify the results, and to document water chemistry changes with time, a second set of ground-water samples was obtained during the period from May 6 to May 10, 1985.

During the initial field investigation, soil sampling was initiated at the therminol spill area adjacent to the pilot plant. Additional samples were obtained during the period from March 18 to March 21, 1985.

Water-level recorders were maintained on Wells D-1 and D-2 during the period from April 1984 to April 1985 to record daily fluctuations in water levels due to climatic

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and cultural influences. Monthly water levels have been measured at all of the wells up to the present time.

This report describes the results of the ground-water sample analyses, the soil sample analyses and the ground-water level observation program.

## GROUND-WATER SAMPLING AND ANALYTICAL RESULTS

### Procedures

The procedures for well evacuation, sampling and equipment cleaning were nearly identical to those described in the previously referenced report. The only difference was that the initial samples were all obtained using the same Teflon tubing, cleaned between uses. The second round samples were obtained from Wells A-2, A-1, B-2, B-1, C-2, C-1, D-2, and D-1 with the same tubing. At the request of the NYSDEC, new tubing was used on each of Wells E-2, E-1, F-2, and F-1 to ensure the integrity of the samples. See figure 1 for the well locations.

The second round water sampling methodology included evacuating at least 4 volumes of well water using a submersible pump. The samples were collected using the pump, except those used for volatiles analyses, which were bailed. During the second round, samples for volatiles analyses were collected through the pump as well as by bailer for Wells D-2, D-1, E-2, E-1, F-2, and F-1 to determine if differences occurred as the result of sampling methods. Measurements of temperature, turbidity, specific conductance and hydrogen ion concentration were taken in the field during the sampling procedure. These measurements and volumes of water pumped are listed in table 1 in the order that sampling occurred. Samples were visually examined and measured for turbidity to determine whether filtration was necessary. Filtration of the samples in the field was limited to Well E-2 which had a high turbidity reading and observed entrained gas. No other samples were filtered.

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Well C-1 had a relatively high turbidity reading but was not filtered because it was apparent that the high reading was due to dissolved iron precipitating on contact with the air. Field blanks were taken between Wells E2 and E1, E1 and F2, and F2 and F1. These samples were collected by pumping laboratory-supplied millipore water through the pumping apparatus into sample containers. Blanks for volatiles were obtained by flushing GC/MS water through bailers.

#### Analytical Data Review

The following discussion is based on analytical data provided by Occidental Chemical Corporation as analyzed by their laboratory on Grand Island, New York and by Environmental Testing and Certification of Edison, New Jersey. Technical aspects of the analytical techniques and quality control are included in a separate section of this report. The parameters analyzed for in the water samples were the same as those from the first round of samples and were chosen to reflect the impact of former plant operations on the ground water based on company records of disposal practices. The detection levels for most of the organic parameters were lowered from 10 ug/l to approximately 1 ug/l for the second round of samples. Barium was present in all of the wells and the highest observed level was in upgradient Well A-1. The NYS standard for barium is 1.0 mg/l.

#### Site A

The TOC, COD, inorganic parameters, and metals detected were low for both shallow and deep wells.

The volatile organic analytical results indicated no detection for all tests in the shallow well except for tetrachloroethylene at 12 ug/l (micrograms per liter) and 1,2 trans-dichloroethylene at 3.4 ug/l. This well had no detectable volatile organics in the first sample. The deep well contained tetrachloroethylene at 23 ug/l, trans-dichloroethylene at 14 ug/l, and trichloroethylene at 27

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ug/l. This latter substance was detected at essentially the same level in the first sampling program and the other substances were not detected at all. The presence of these chemicals again indicates an upgradient source or sources of volatile organic chemicals.

#### Site B

No inorganic parameters or metals were at levels worth noting in either the shallow (B-1) or deep (B-2) well. COD increased slightly compared to the first round sample from 4 mg/l to 10 mg/l in the deeper well. The only volatile organic chemical detected was trichloroethylene (3 ug/l in Well B-2), which must have an upgradient origin.

#### Site C

The level of COD found in the shallow well (C-1) had decreased slightly from the first round of sampling. Trichloroethylene, which was not detected in the shallow well in the first sample, was detected at 11 ug/l in the second sample. This substance was also detected in the deeper well at 4.1 ug/l. The level of tetrachloroethylene had decreased in the deep (C-2) well, from 50 ug/l to 18 ug/l. It is believed that these chemicals have migrated from an upgradient source, based on the hydrogeology of the site and the analytical results from Site A. Cadmium was present in the shallow well at 30 ug/l.

#### Site D

The results indicate that the levels for inorganics, metals, COD and TOC are not notable. The analytical results for the shallow (D-1) well show that previously detected volatiles (trans-dichloroethylene and trichloroethylene) were not detected even though the detection level was lower for the second round of samples. A substantial decrease in the level of tetrachloroethylene (160 ug/l to 15 ug/l) was

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also observed. The water in this well originates from the well location to several hundred feet upgradient based on the observed hydraulic head relationships. Because the property line is 90 feet upgradient this chemical could have originated off-site. It has already been established that there is an off-site source of tetrachloroethylene, and this chemical was not found in the soil column at this site. The deep well has had no volatile organics.

#### Site E

The shallow ground water at this site (Well E-1) showed increases in COD, TOC, 1,2-transdichloroethylene and vinyl chloride. There was no hydrocarbon sheen on the water when checked by the NYSDEC with a clear plastic bailer prior to evacuation.

The deep well (E-2) at this site had no hydrocarbon sheen on a bailer sample, but the collected discharge in the 55-gallon drum had a slight sheen. There was entrained gas and a strong odor which may be related to the higher COD and TOC values in this well. We have been advised that the use of two wells was discontinued due to the presence of iron precipitating bacteria. The COD rose from 15 to 28 mg/l. None of the inorganic parameters were present at above-normal levels and none of the organic chemicals analyzed for were present.

The water in Well E-1 originates from the adjacent sump, localized infiltration, and upgradient areas. Based on the hydraulic head relationships, upgradient ground water originating from as far as several hundred feet away may effect this well, and the property line appears to be about 75 feet upgradient. The ground water in E-2 may be affected by infiltration from the sump, and may also originate from a considerable distance upgradient. The results of the present analytical program cannot account for the levels of COD and TOC observed at this location.

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### Site F

Shallow Well F-1 has exhibited a substantial decrease in concentration of 1,2 trans-dichloroethylene (130 to 22 ug/l) and vinyl chloride (140 to 38 ug/l). Despite the decrease in the volatile organics tested for, there has been an increase in COD (46 mg/l to 170 mg/l) and TOC (22 mg/l to 43 mg/l). The parameters tested for in the present analytical program cannot account for these values. (Upgradient values for COD are about 3 mg/l to 10 mg/l, and, for TOC are 1 mg/l to 4 mg/l.)

Well F-2, the deep well at this site, had a substantial reduction in the levels of 1,2 trans-dichloroethylene (200 ug/l to non-detectable) and vinyl chloride (50 ug/l to non-detectable). The discharge had a slight sheen and contained entrained gas. As at F-1, the high values of TOC and COD in this well water cannot be accounted for by the present analytical program but may be related to the entrained gas. The improvement in water quality at this location may be attributed to two factors. The first is the discontinued use of the adjacent basin for water disposal; the second is the installation of runoff controls at the nearby tank farm.

Figures 2 and 3 present the pertinent analytical data.

### THERMINOL AREA SOIL SAMPLING AND ANALYTICAL RESULTS

#### Procedures

Four additional excavations were made to further define the areal extent of the PCB contamination in this area. The holes were located approximately 10 feet from the previously-sampled borings as shown on figure 4. They were excavated by pick and shovel to 1 foot below grade and were continued using a hand auger to 6 feet below grade. After augering to approximately 3 feet below grade a steel casing was installed in the hole to keep the hole open. Samples were collected in the augered hole with a split-spoon

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sampler while samples were taken from the top 1 foot by hand. All sampling equipment was thoroughly cleaned with wire brush and clean water, sprayed with methanol, hexane, and then methanol and finally sprayed with clean water. This cleaning procedure was followed for all samples collected except where additional soil was needed at one depth to fill the sampling jars. Selected samples were split with the New York State DEC.

#### Analytical Data

The data indicate that the upper one foot of soil in the second round of borings is contaminated with PCB's. Only Boring S had significant levels of PCB's below the top one foot of soil (300 ppm at 3 feet). The data collected to date at this site indicate that the visually clean soil had low or non-detectable levels of PCB's. Figure 5 shows the sampling intervals.

### HYDROGEOLOGY

#### Water-Level Fluctuations

Water-level recorders were maintained on the wells at Site D for the period from April 1984 to May 1985. The hydrograph for Well D-1 is shown on figure 6, along with the daily precipitation for the Westbury station. As can be seen, the water table responds to significant periods of rainfall, such as late May 1984. However, the small water-level fluctuations, such as on September 25, 1984, are attributed to pumpage from wells. The data indicate that the water-level influence at the Ruco plantsite from this off-site pumpage is on the order of 0.1 to 0.2 foot.

Long-term hydrographs have been maintained for all of the wells from the time they were installed until the present. The graphs are shown on figures 7 through 12. The year 1984 was a relatively wet year and significant recharge to the ground-water system continued into July. This was

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followed by a relatively dry 1985. Although the record does not follow a normal yearly fluctuation pattern for Long Island, it does provide a reasonable estimate of the range of water-table fluctuations. The fluctuation was about 7 to 8 feet, with the exception of Well C-1 which is affected by the adjacent cooling water recharge basin.

#### Directions of Flow

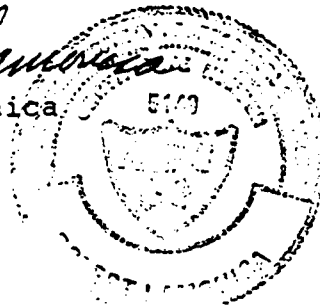
Figures 13 through 16 show the elevation of the water table and the directions of ground-water flow on the days of the highest and lowest observed water levels in both the shallow and deep wells. The direction of flow in the shallow wells is essentially unchanged from the time of the first report, although the lowest water table (November 1, 1985) shows the direction of flow to be more towards the south than the southwest.

In the deeper wells, the water levels show a more southerly flow pattern than the water-table wells. Similarly, the low-water level map indicates a more southerly flow direction than the high water-level map.

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*Robert Lamonica*

Robert Lamonica  
Associate



dmt  
February 28, 1986  
rl86

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FIGURES

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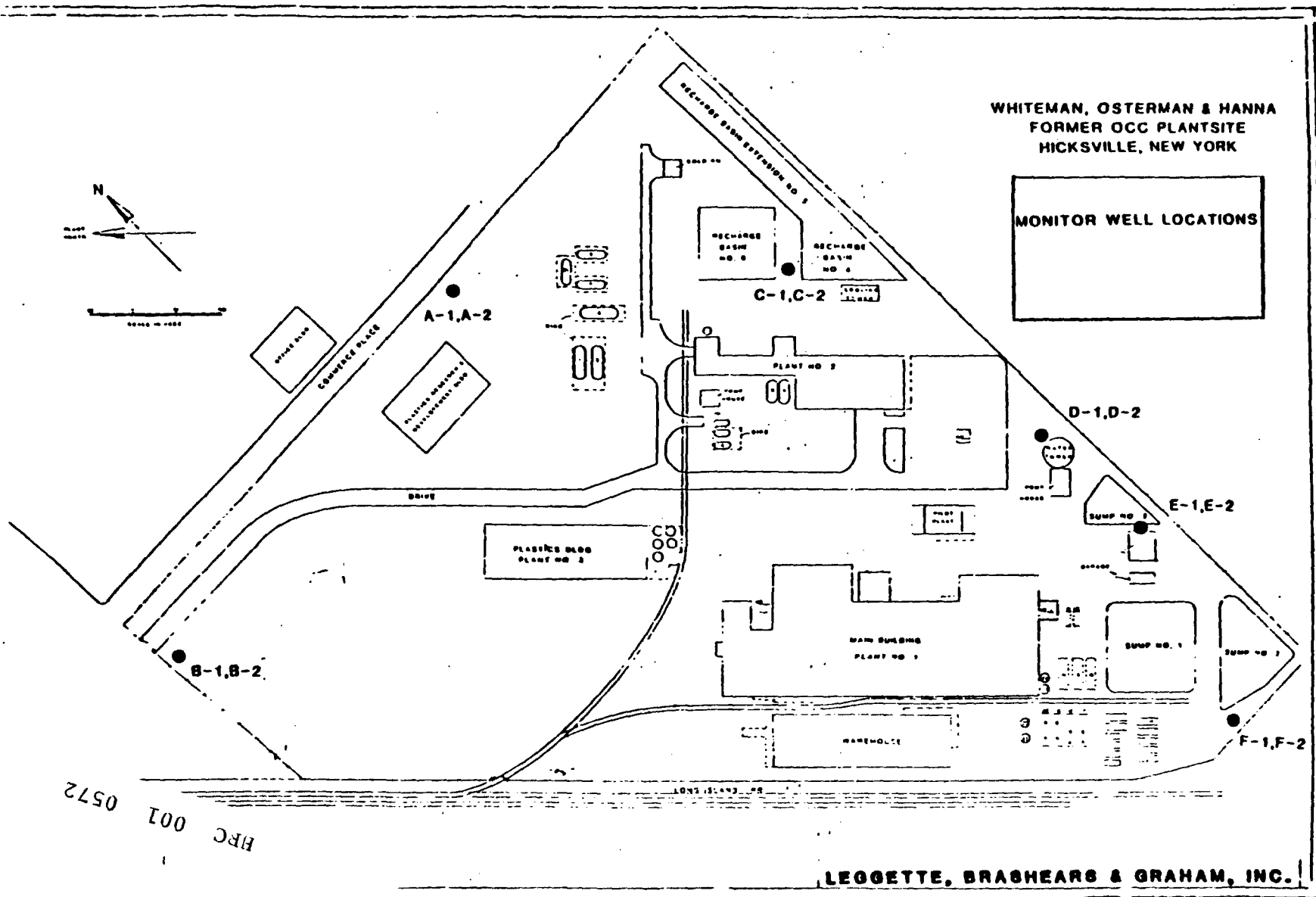


FIGURE 1

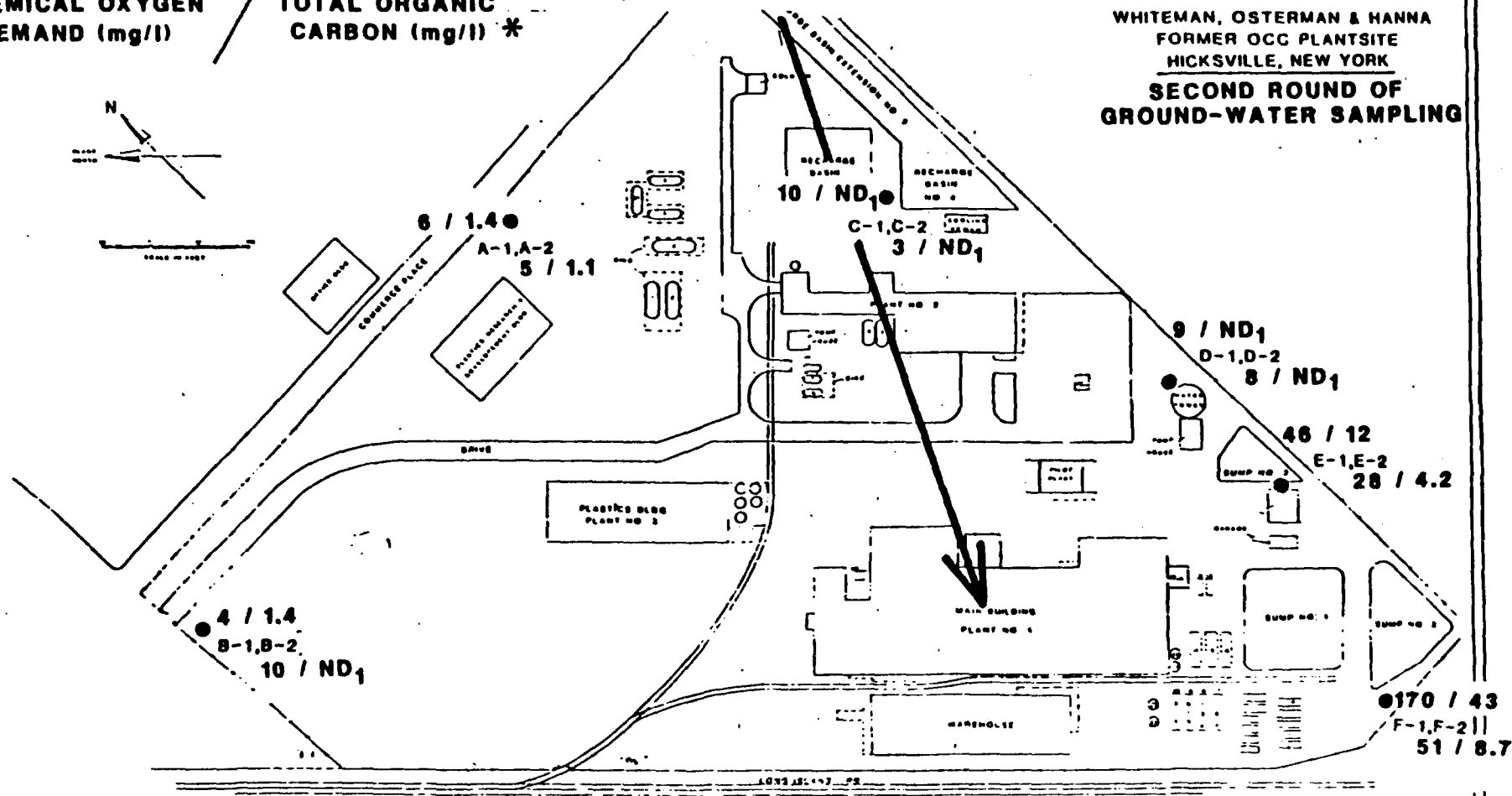
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**CHEMICAL OXYGEN  
DEMAND (mg/l)**

**TOTAL ORGANIC  
CARBON (mg/l) \***

**DIRECTION OF  
GROUND-WATER FLOW**

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**FORMER OGC PLANTSITE**  
**HICKSVILLE, NEW YORK**  
**SECOND ROUND OF**  
**GROUND-WATER SAMPLING**



\* ND<sub>1</sub> - NOT DETECTED

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**FIGURE 2**

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HICKSVILLE, NEW YORK**

**VOLATILE ORGANICS**

179

A-1, A-2

**TCE 11**

C-1.C-2

**PCE 18**

**TCE 4.1**

1.A-2

**PCE 23**

**TCE 27**

**DCE 14**

**PCE 15**

**D-1, D-2**

[N-]C

## TCE 7.2

DCE 161

**VCM 42**

~~SECRET~~ E-1, E-2

ND

PLASTICS CLUB

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**DCE 22.3**

VCM 38.

**F-1, F-2**

**ND**

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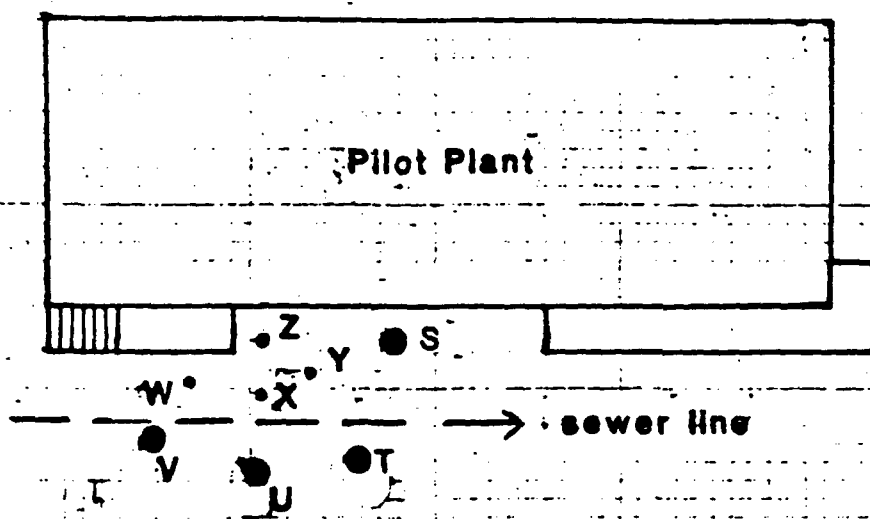
**FIGURE 3**

FIGURE 4

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FORMER OCC PLANTSITE  
HICKSVILLE, NEW YORK

LOCATIONS OF PILOT PLANT BORINGS

1 inch = 20 feet



LEGEND

● PILOT PLANT BORINGS

◎ PROPOSED ADDITIONAL BORINGS

Plant #1

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## SOIL BORING AND SAMPLE DESCRIPTIONS IN THE VICINITY OF THE PILOT PLANT, RUCO POLYMER CORP. HICKSVILLE, N.Y.

	HOLE V	HOLE W	HOLE Y	HOLE Z
0.0	Blacktop and traprock	Asphalt and traprock	Asphalt and traprock	Asphalt, trap sand (black) gravel
1.0	Sample: S14W3001A1 Sand, gravel, stones; oily texture	Sample: S14W3001A1 and S15W3001A1 Sand, gravel, blacktop oil, dark color	Sample: S15AT3001A1 Sand, gravel, cobbles, dark oily brown; brown-tan	Sample: S15Z3001A1 Sand, medium to very coarse, gravel, cobbles; dark brown
2.0	Cleared	Cleared Sand, cobbles, gravel; tan/gray	Cleared	Cleared oil, dark sand
3.0	Sample: S14W3002A1 Sand, gravel, stones; tan	Sample: S15W3002A1 Sand, gravel, stones and roots; tan	Sample: S15ST3001A1 Medium to very coarse sand, gravel and large stones; tan	Sample: S15Z3002A1 Medium to very coarse sand, gravel and cobbles; tan
4.0	Sample: S14W3004A1 Sand, gravel, stones; tan	Sample: S15W3004A1 Sand, gravel, cobbles; tan	Sample: S15673004A1 Medium to very coarse sand, cobbles, gravel and large rocks; tan	Sample: S16Z3004A1 Fine to very coarse sand, cobbles and gravel; tan
5.0	Sample: Same	Large round rocks	Sample: S15773004A1 Fine to very coarse sand, gravel and some cobbles; tan	Sample: S1673004A1 Fine to very coarse sand, gravel, coarse cobbles; tan
6.0				

### WELL POSITION WITH Z AS REFERENCE

ZW 9.8 ZY 9.8  
ZY 18.8 ZT 18.4  
ZX 9.1 ZG 14.8  
ZU 18.7

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FIGURE 5

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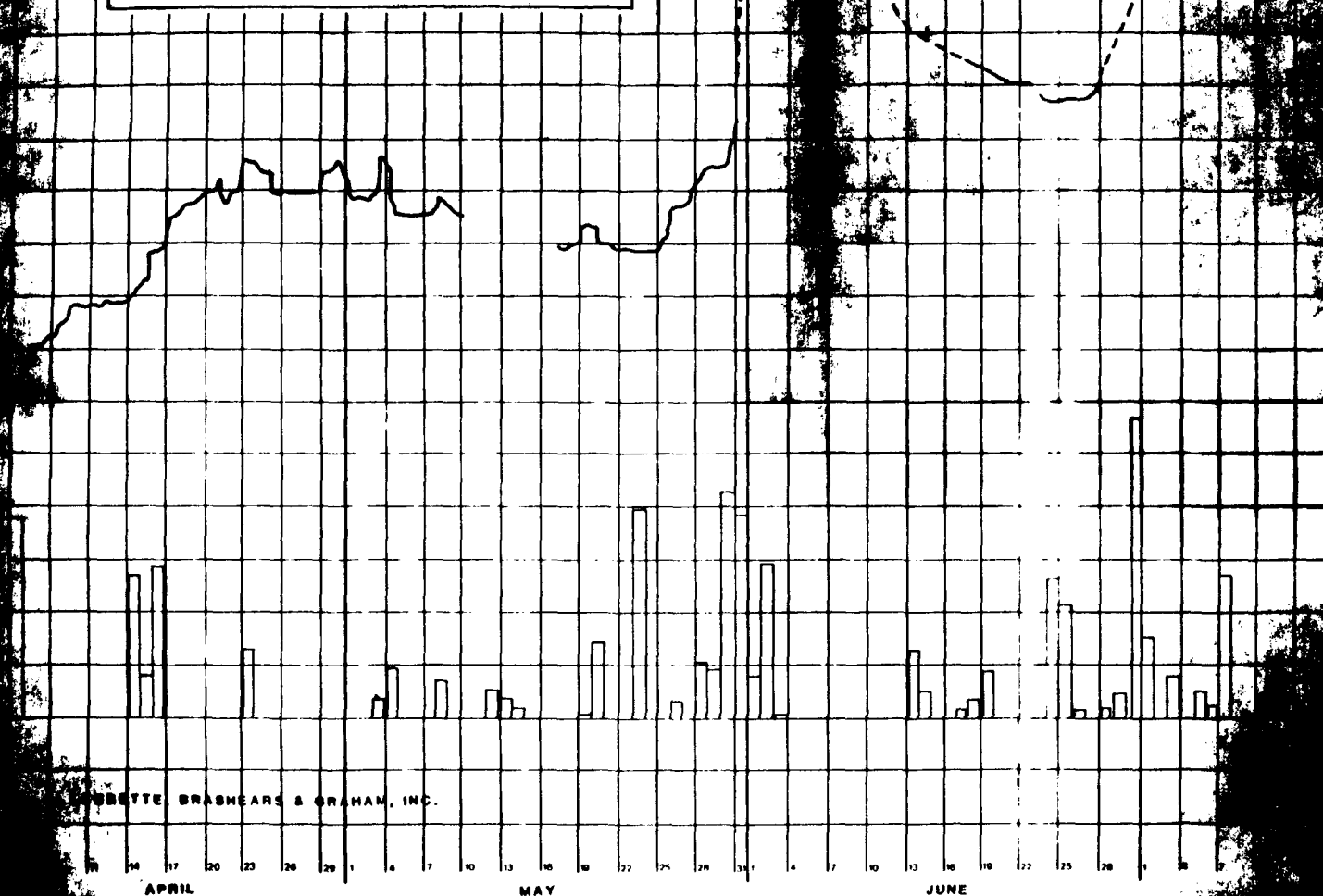
FORMER OCC PLANTSITE

HICKSVILLE, NEW YORK

WATER-LEVEL HYDROGRAPH

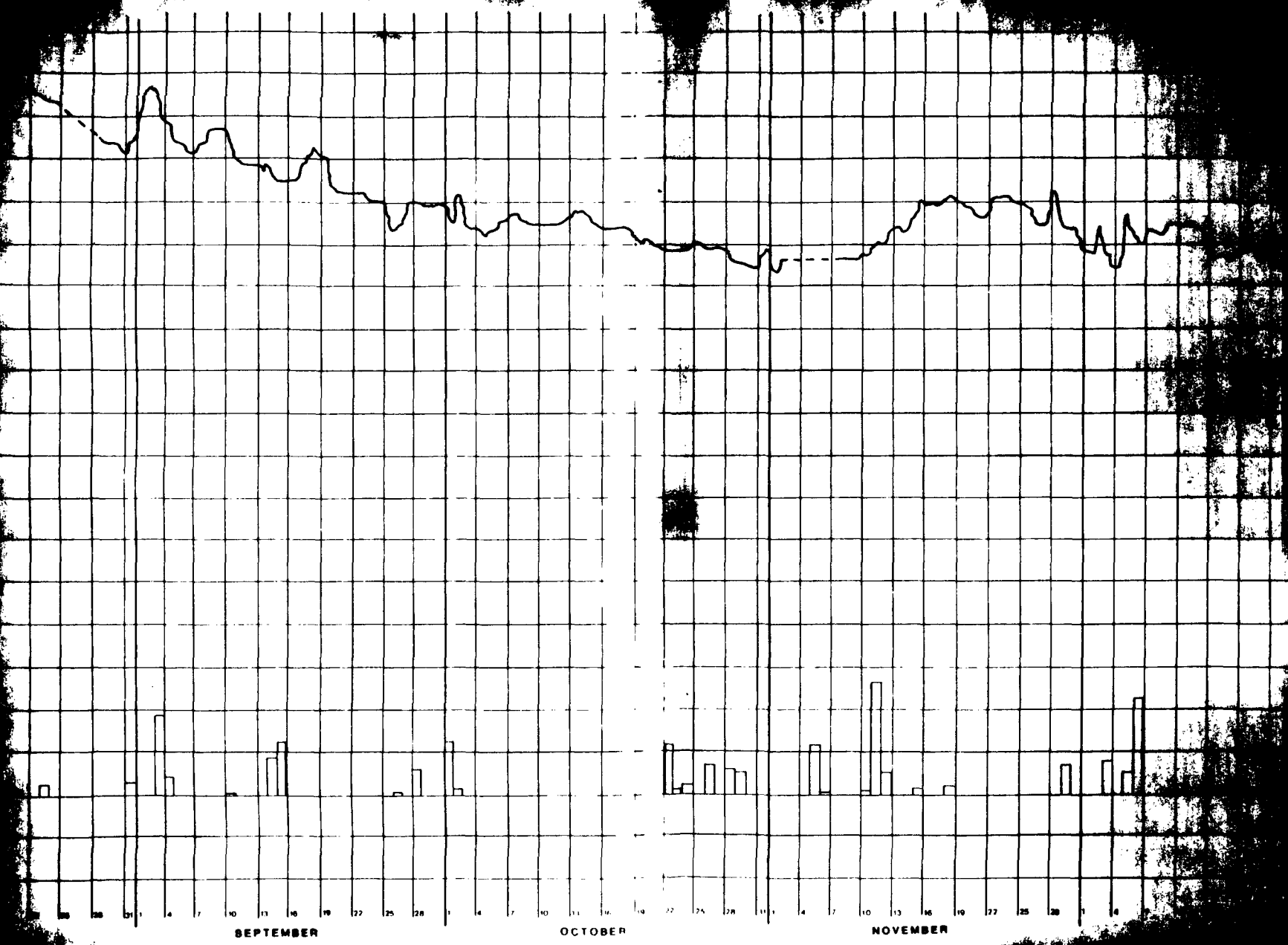
FOR WELL D-1

APRIL 5, 1984 TO MAY 8, 1985

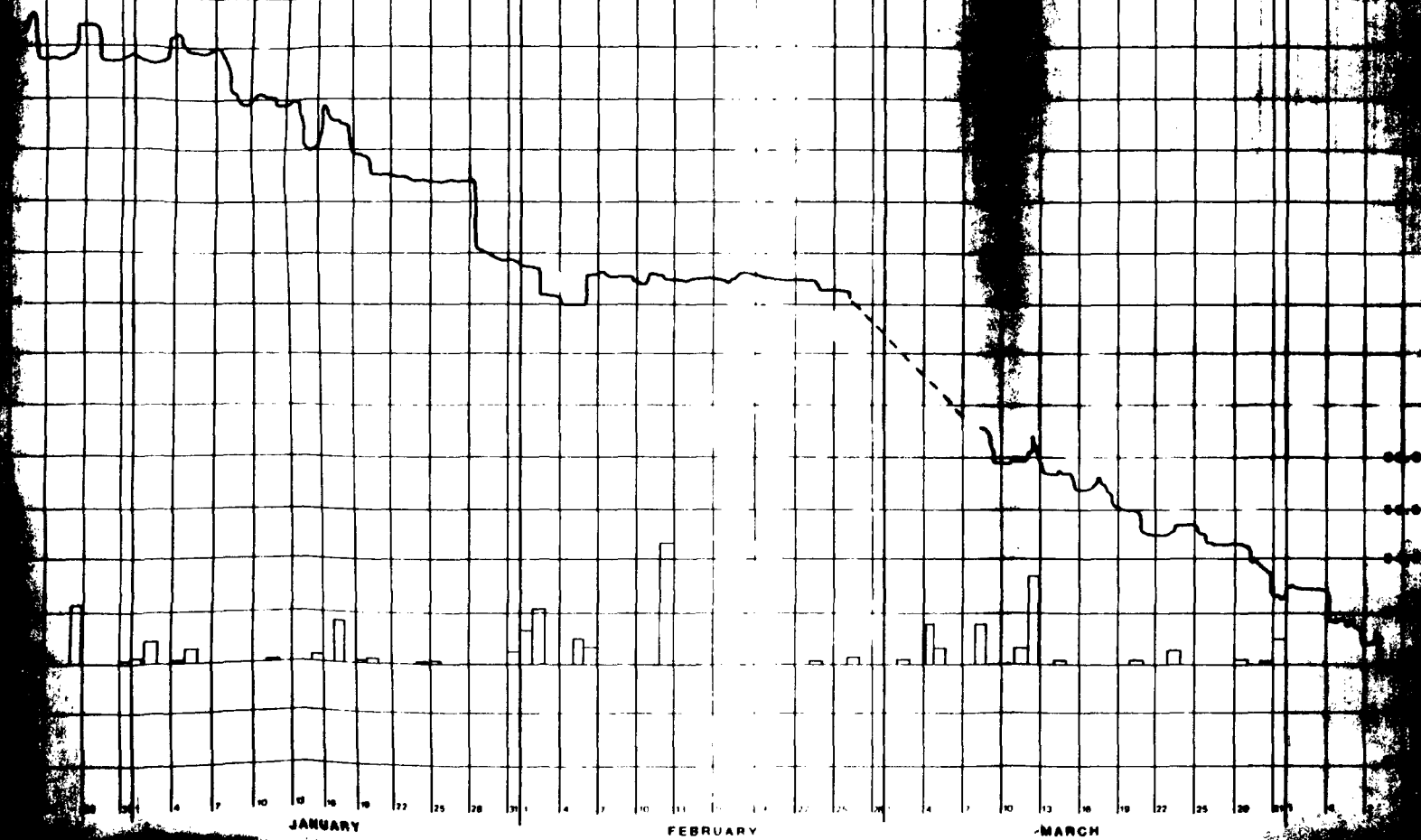


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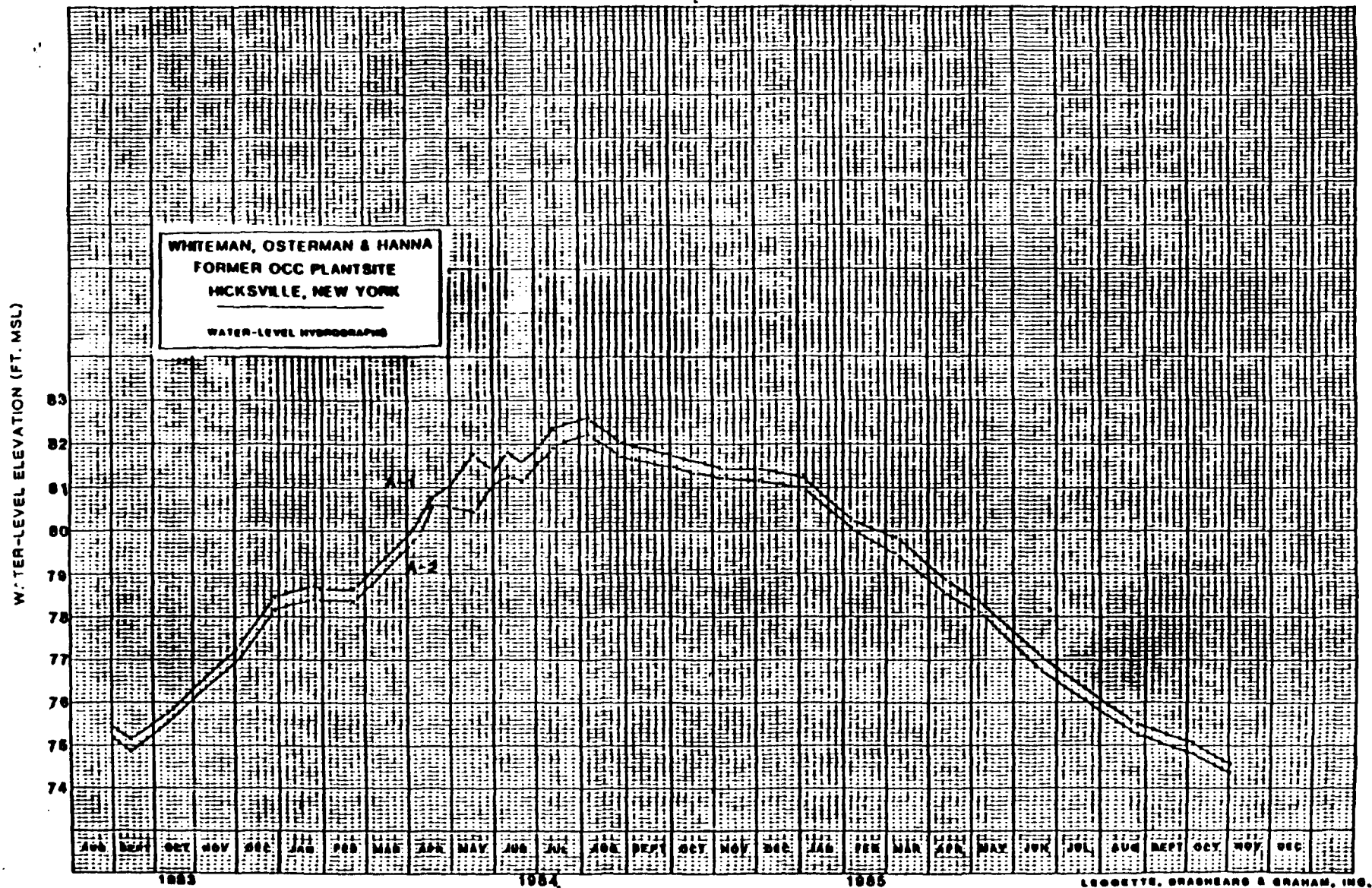


FIGURE 7

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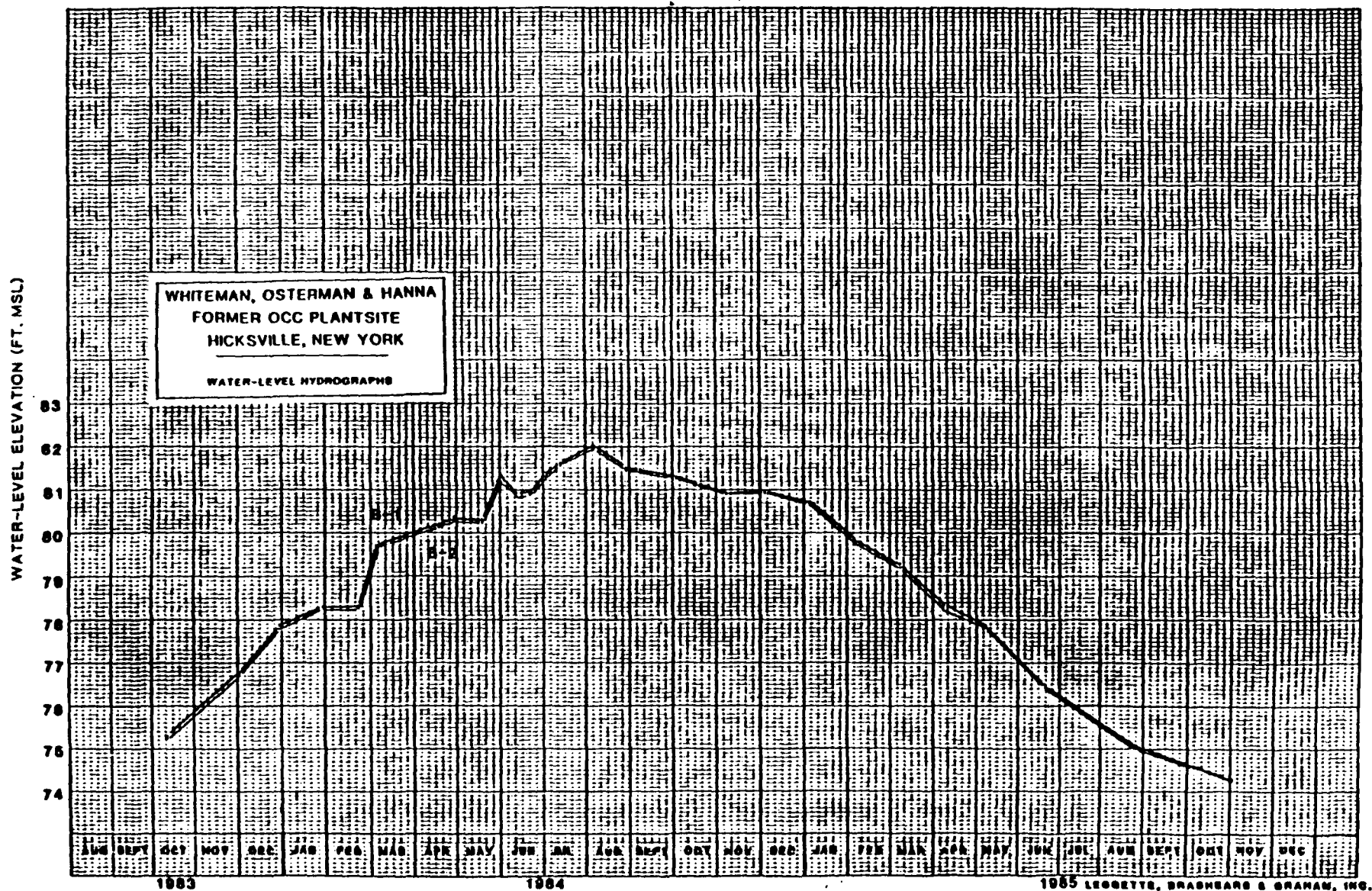


FIGURE 8

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WATER-LEVEL ELEVATION (FT. MSL)

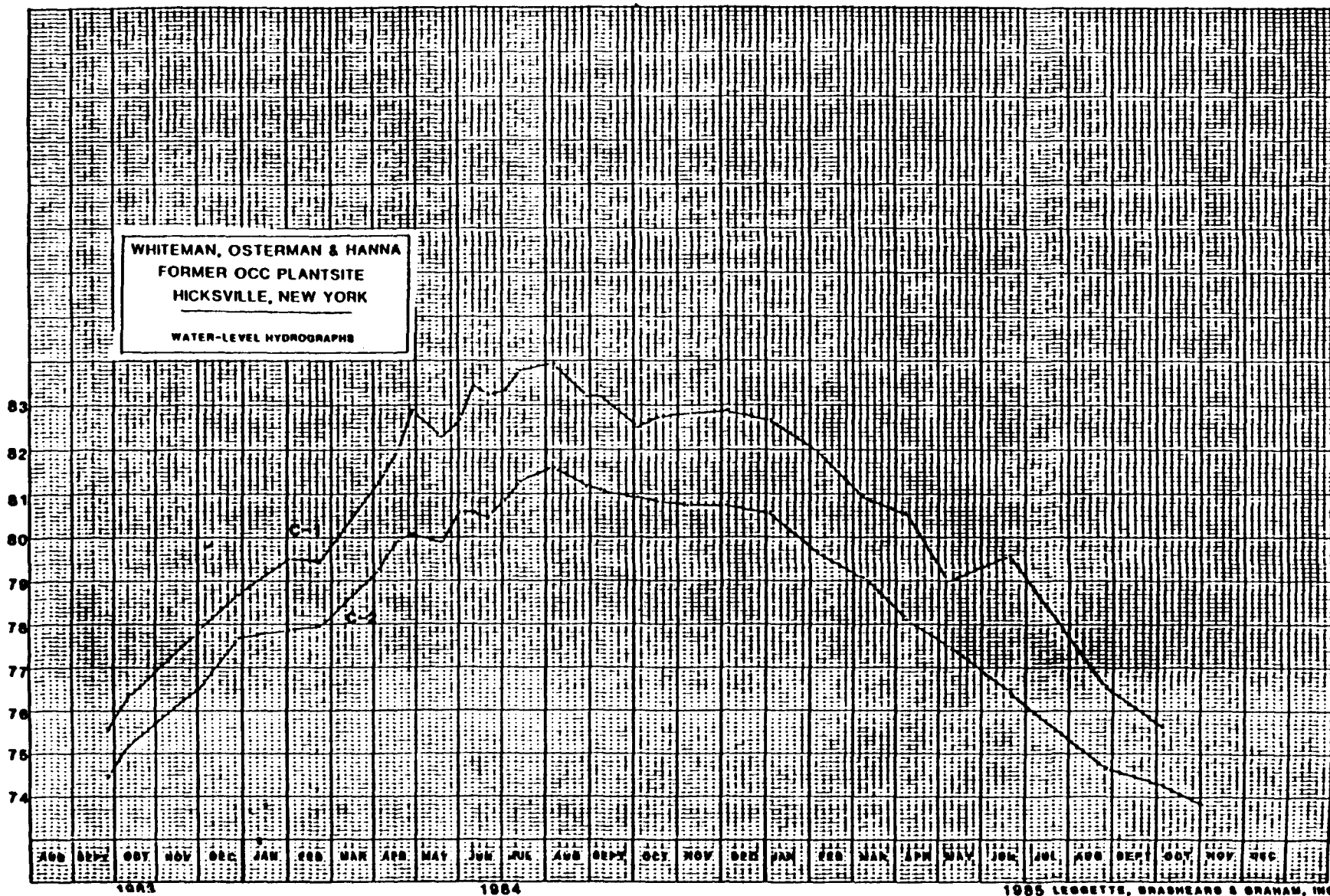


FIGURE 9

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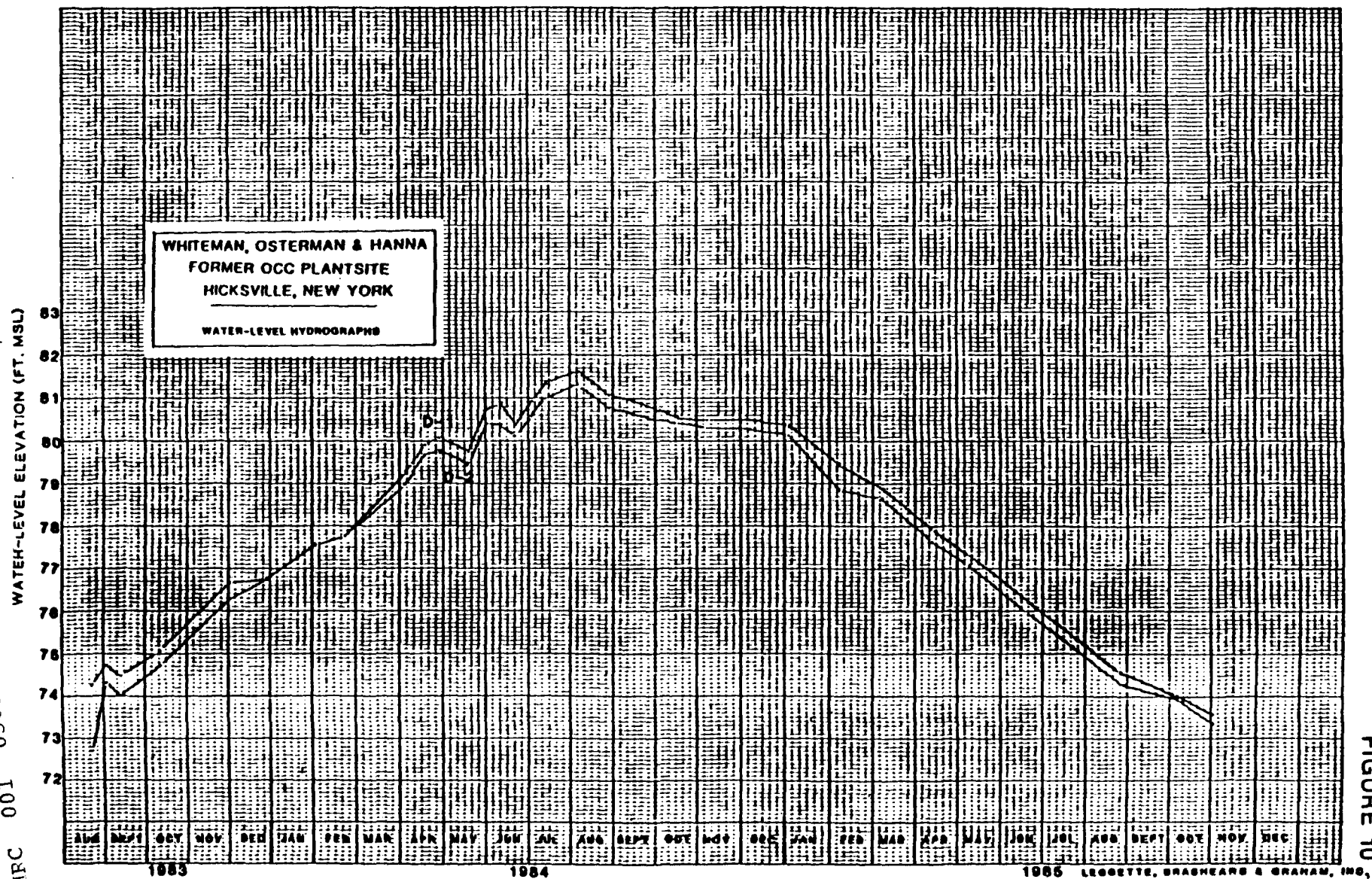


FIGURE 10

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WATER-LEVEL ELEVATION (FT. MSL)

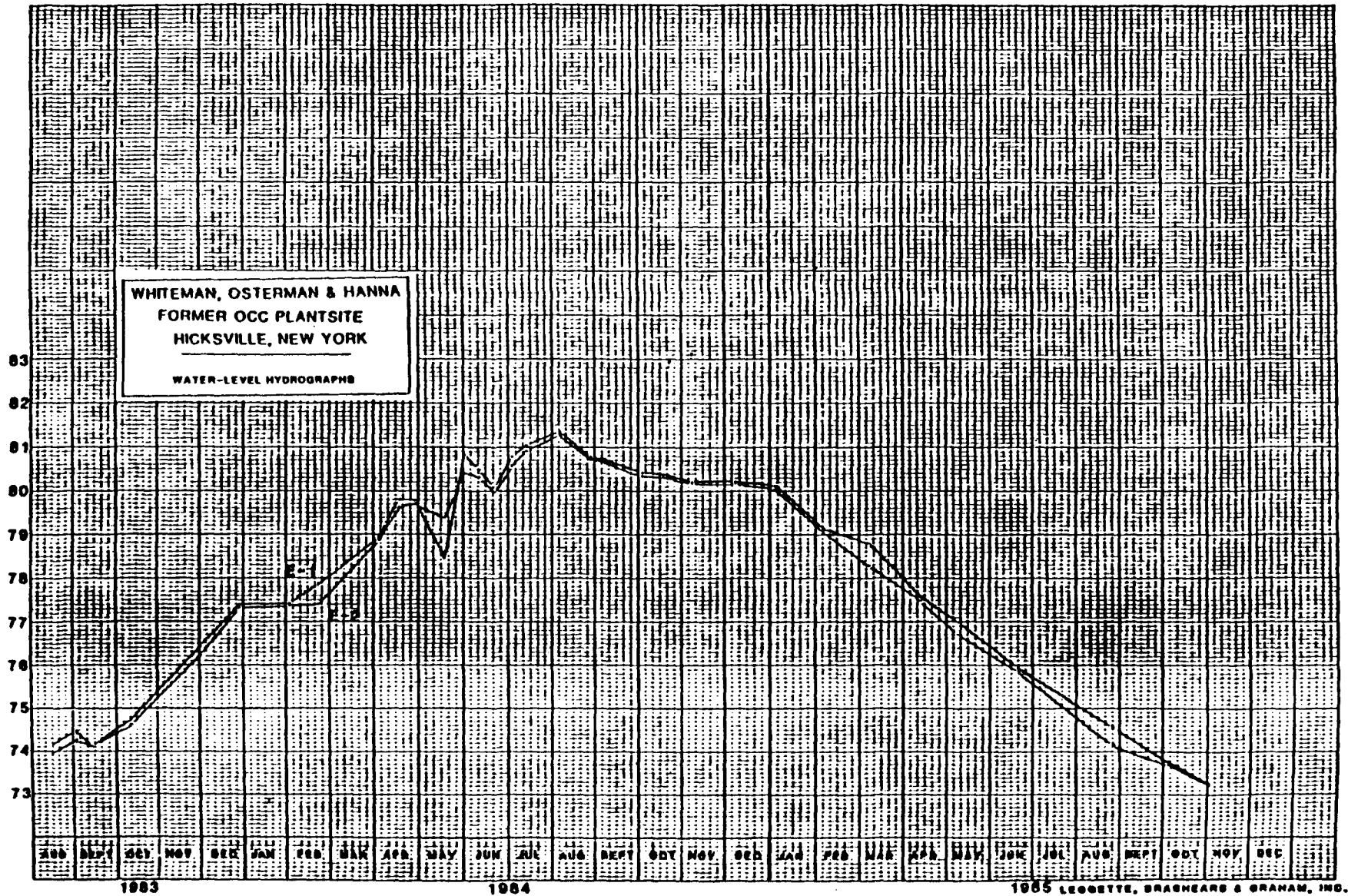
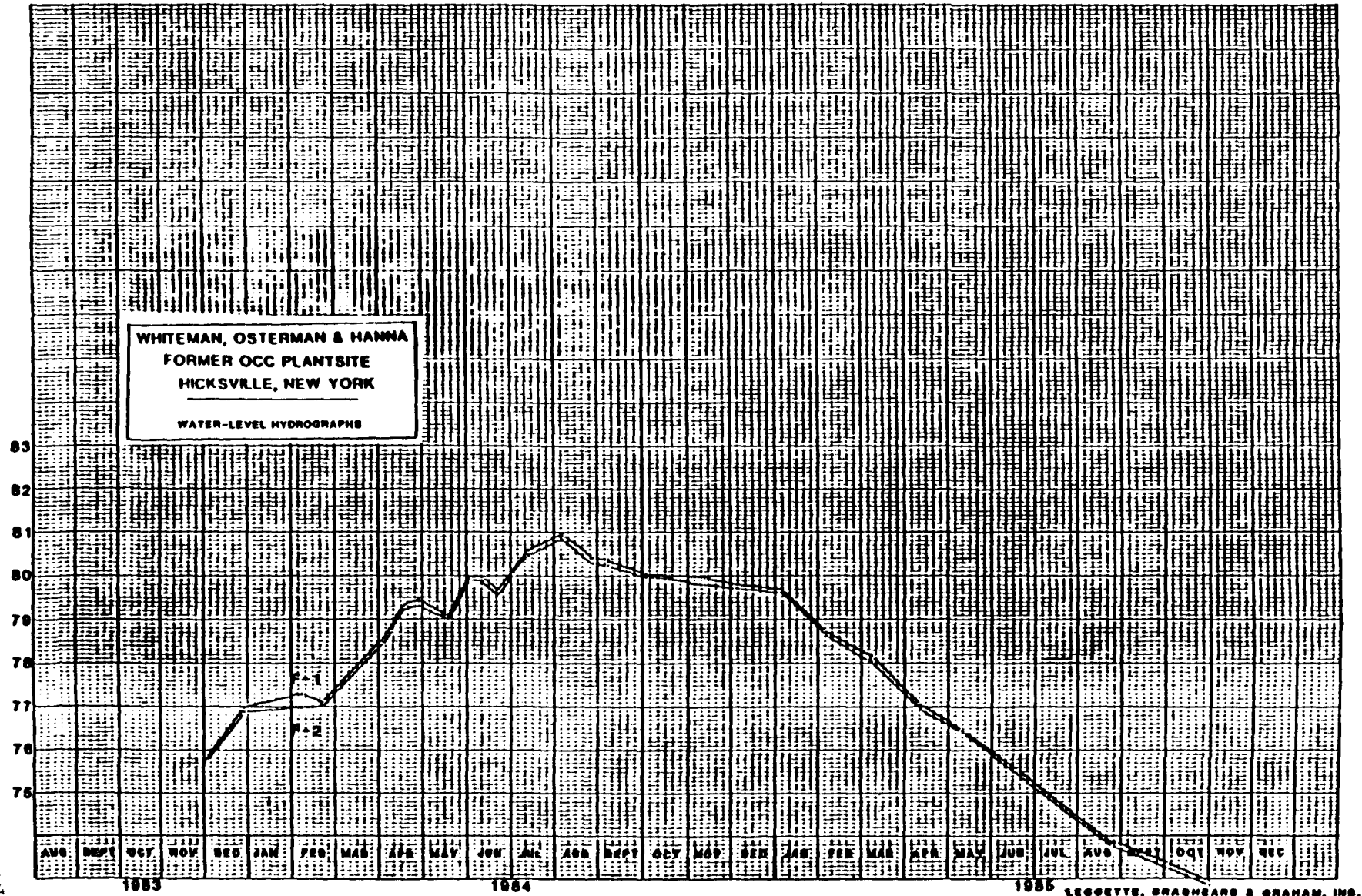


FIGURE 11

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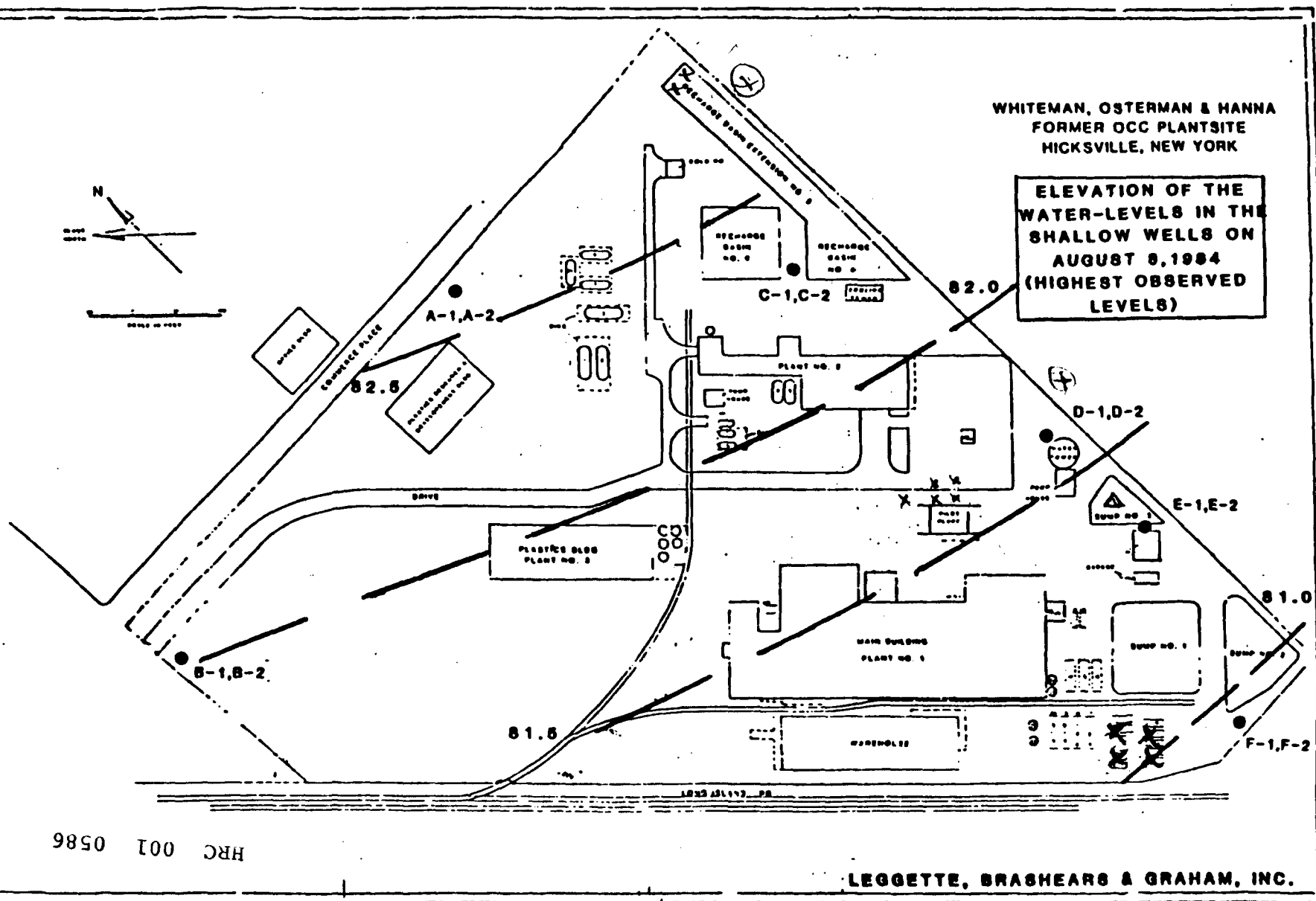
WATER-LEVEL ELEVATION (FT. MSL)



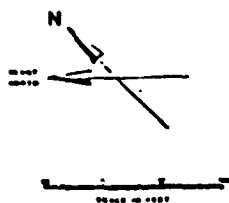
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FIGURE 12

- Δ sump boring + sampling
- ⊗ well clusters
- x. soil samples



**FIGURE 13**



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HICKSVILLE, NEW YORK

ELEVATION OF THE  
WATER-LEVELS IN THE  
SHALLOW WELLS ON  
NOVEMBER 1, 1985  
(LOWEST OBSERVED  
LEVELS)

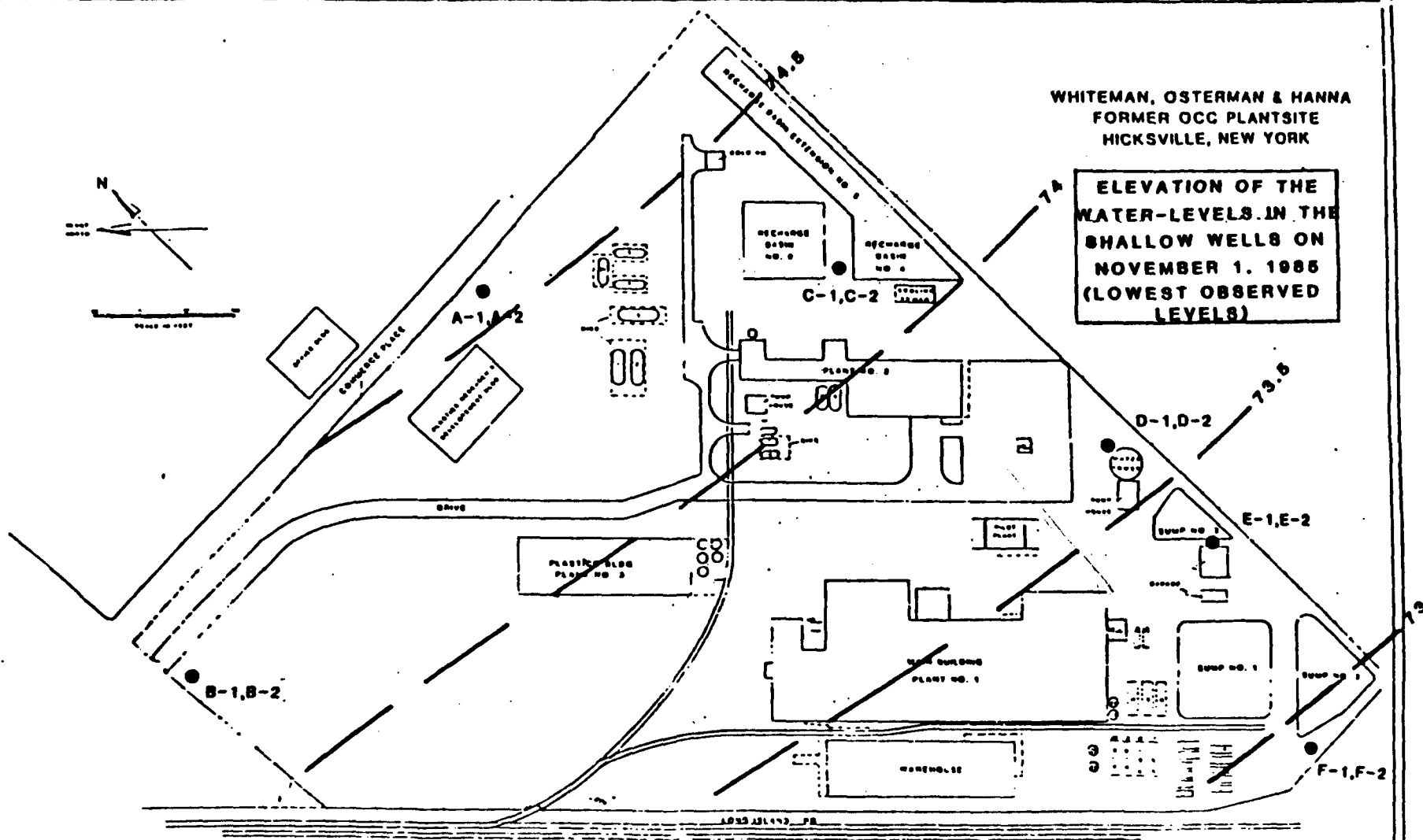
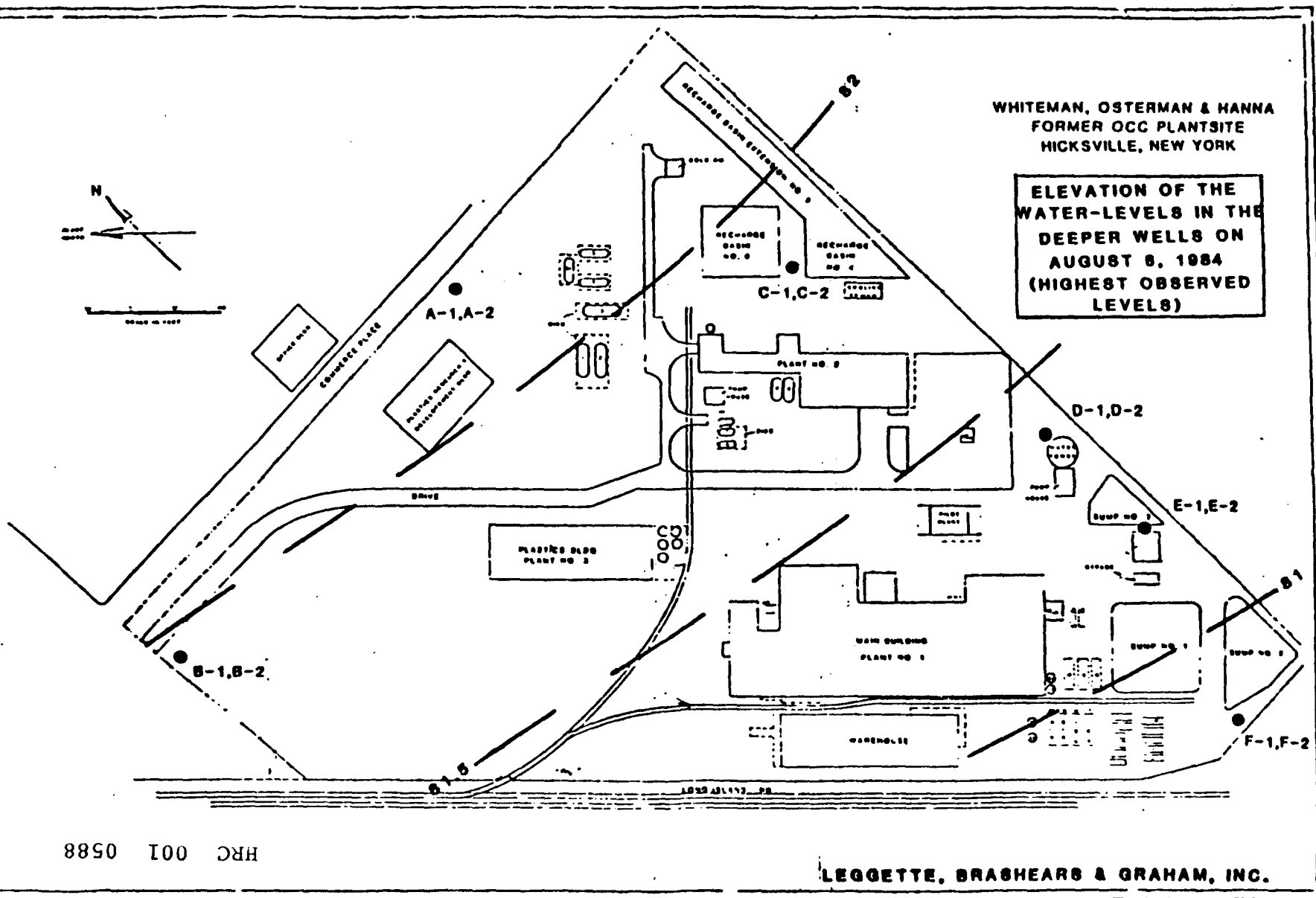
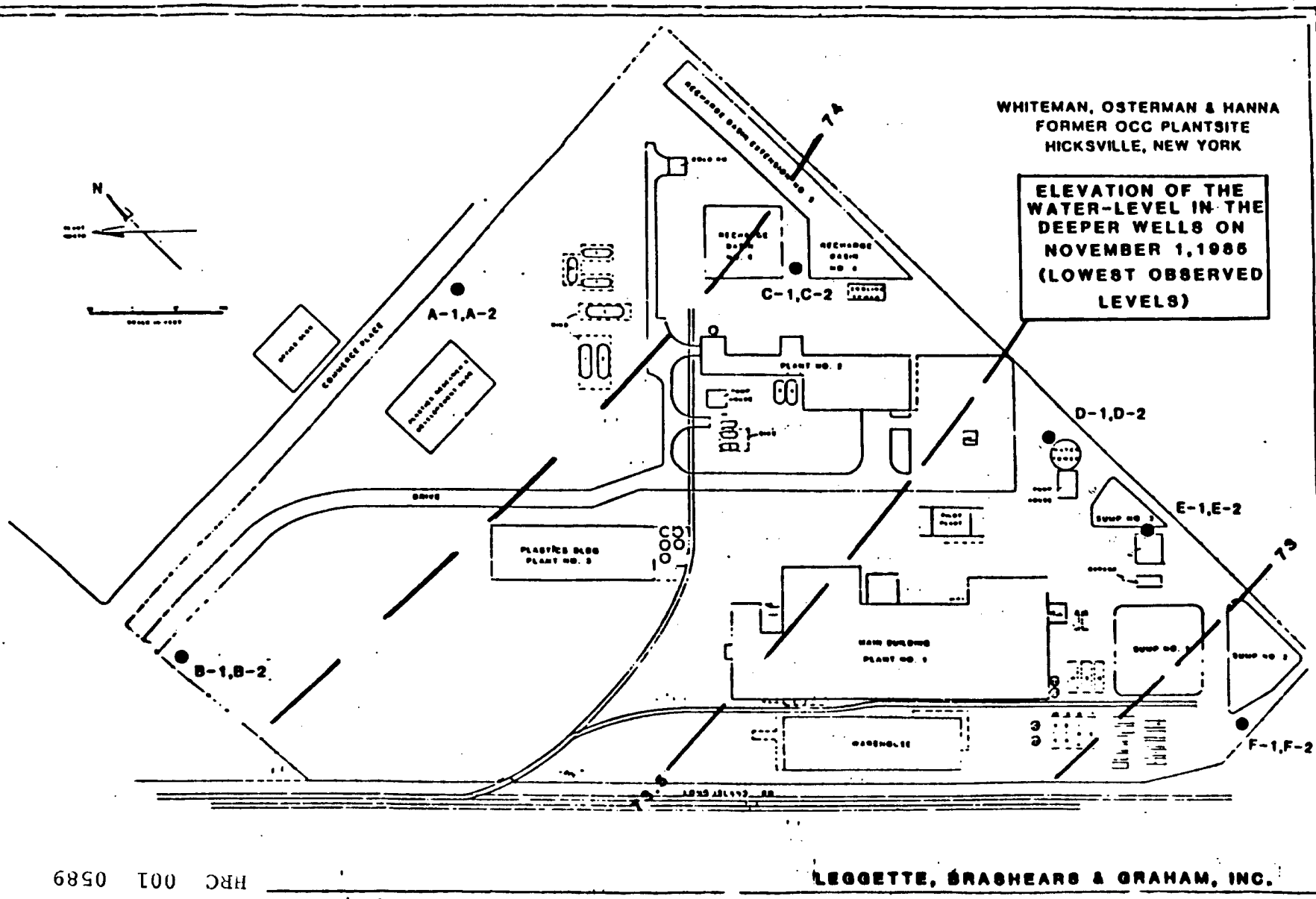


FIGURE 14

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TABLES

TABLE 1

OCCIDENTAL CHEMICAL CORPORATION  
FORMER RUCO DIVISION PLATINSITE  
HICKSVILLE, NEW YORKField Sampling Data for  
Second Round of Sampling

Well #	1985 date	Volume of water in well (gals.)	Volume removed* (gals.)	Turbidity (NTU's)	Temperature (°C)	Specific conductance (umhos/cm)	pH	Remarks
A-2	05/06	8.5	50	0.42	17.8	73	5.5	clear
A-1	05/06	1.3	25	0.65	17.5	160	5.7	clear
B-2	05/07	7.9	50	0.65	16.0	193	6.5	clear
B-1	05/07	2.3	35	0.77	17.0	145	6.9	clear
C-2	05/07	10.5	50	0.74	16.0	130	6.6	clear
C-1	05/07	2.1	55	0.82-1.2	15.0	90	6.4	iron precipitate
D-2	05/08	5.7	55	0.60	14.5	135	7.0	clear
D-1	05/08	1.6	25	0.70	14.0	115	6.1	clear
E-2	05/08	5.6	75	0.95	16.0	217	7.0	strong odor, color
E-1	05/09	1.8	25	0.57	18.0	265	6.7	odor, clear
F-2	05/09	8.8	45	0.48	18.0	280	6.9	odor, clear
F-1	05/10	2.0	40	0.46	18.5	300	6.85	odor, clear

HRC 001 0591

REPORT OF GROUNDWATER AND SOILS INVESTIGATION  
AT THE FORMER RUCO DIVISION PLANT SITE - HICKSVILLE, N.Y.

2nd Round of Sampling

Section III

Analytical Chemistry

February 1986

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## I N D E X

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## 1.0 INTRODUCTION

This report describes the results of the analysis of groundwater and soil samples taken at the former Ruco Division Plant site in Hicksville, New York, March 18-21, 1985. This is the second phase of a study of groundwater conditions at the Ruco Plant. The first phase was reported in October 1984 in "Report of Groundwater and Soils Investigation at the Former Ruco Division Plant site, Hicksville, New York". (1984 Report)

## 2.0 CONCLUSIONS

- o Water samples from twelve locations were analyzed for a variety of parameters. None of the organic parameters analyzed for were found at 4 locations. Of the remaining locations, four had only one compound, two had two compounds and two had three compounds. Only one value was over 50 ppb and none were over 200 ppb.
- o The results were compared with the results of the 1984 Report. In general, the agreement of groundwater quality parameters were good. Significant decreases in volatile chemical concentrations were found in wells C2, D1, F1, and F2. There was a small increase in the concentration of volatile chemicals in wells A1, A2 and E1.
- o The vinyl chloride concentrations in wells F1 and F2 dropped from 140 ppb to 38 ppb and from 50 ppb to not detected respectively. The vinyl chloride concentration in well E1 increased from 7 ppb to 42 ppb.
- o Phthalates were not found in the groundwater. Those present in samples were a result of sample contamination, either in the field or laboratory.
- o The extent of the therminol spill area was further deliniated.

## 3.0 ANALYTICAL CHEMISTRY

### 3.1 Introduction

Groundwater samples were taken March 18-21, 1985 by Leggette, Brashears & Graham (LB&G) personnel from 12 wells located as shown in

Figure 3.1. Soil samples were taken at four sites generally at four depths each, in the area of the therminol spill. The approximate sampling locations are shown in Figure 3.2.

The analyses of groundwater for volatiles and soils for Aroclor 1248 were conducted by the ETC Laboratory, Edison, N.J. The analysis of groundwater for phthalates and MOCA was conducted by the Occidental Chemical Corporation (OCC) laboratory at Grand Island, NY. Five duplicate groundwater samples for volatiles and one duplicate soil for Aroclor 1248 were analyzed by the OCC laboratory. These samples were analyzed as part of the quality assurance program for the project.

Analyses for metals and inorganics were performed by the ETC lab except for Sulfate, Nitrate, COD and Phenols which were sub-contracted to Chyun. Turbidity, pH, temperature and conductivity measurements were made in the field by LB&G.

### 3.2 ETC Results

The groundwater results are shown in Table 3.1. The analytical methods used were the same as those used for the first part of the program (1984 Report).

These methods are given in detail in the ETC reports. A complete set of the ETC reports is available in Appendix A (bound separately). The Therminol spill area soil results are shown in Table 3.2. The method used was the same as that used for the first part of the program (1984 Report). Details of the analysis and the results are given in the ETC reports, Appendix A.

### 3.3 OCC Results

The results of analysis of groundwater for phthalates are also included in Table 3.1. The methodology used was EPA 625, modified to include 4,4'-methylene bis(o-chloroaniline) (MOCA). The method was verified using a sample from Well E1 prior to the second round of sampling. Details are given in Attachment A. The report of the analysis of phase two samples for phthalates, MOCA and volatiles is given in Attachment A. The OCC methodology for volatiles was EPA 624, the same methodology as used by ETC. OCC used EPA 608 for the analysis of the soil sample for Aroclors (Attachment A).

#### 4.0 QUALITY ASSURANCE

##### 4.1 ETC

A review of the Hicksville analytical program was made in December 1985 at the ETC laboratory by OCC personnel. In general, all analyses were performed in accordance with the requirements of the study. The detection limits for volatiles were reduced from 10 ug/L as used in the first phase to compound specific detection limits (generally 2 to 6 ug/L) as currently defined by EPA protocol.

Quality control data indicate that no major problems existed in the analytical program. The performance of the laboratory was satisfactory.

##### 4.2 OCC

A quality assurance review of the Hicksville Analytical program was made at the OCC laboratory in December 1985. In general, all analyses were performed in accordance with the requirements of the study.

Documentation was complete for all phases of the quality assurance program including chain of custody analytical methodology, calibration and quality control.

Quality control data indicate that no major problems existed in the analytical program. Low levels of two phthalates were found in five samples. Bis(2-ethylhexyl)phthalate was found in a blank at a concentration similar to those reported for the samples. Review of the data suggests that the presence of phthalates was a result of sample contamination. Phthalates are not thought to be present in the groundwater. The performance of the laboratory was satisfactory.

#### 5.0 DISCUSSION OF RESULTS

##### 5.1 Groundwater

Water samples from 12 locations were analyzed for a variety of parameters. None of the organic chemicals analyzed for were found in four of the wells. Of the remaining locations four had only one compound, two had two compounds and two had three compounds. Only one location showed a concentration over 50 ug/L (ppb), that was well E1 which contained 161 ug/L of 1,2-transdichloroethylene.

The results were compared with the results of the 1984 report Table 5.1. In general, the agreement of the groundwater quality parameters was found to be good. Significant decreases in the concentrations of chemicals were found in wells C2, D1, F1 and F2. The concentration of 1,1-dichloroethylene in well C2 decreased from 50 ug/L to 18 ug/L; 1,1-dichloroethylene and trans-1,2-dichloroethylene decreased 160 ug/L to 15 ug/L and from 24 ug/L to not detectable respectively in well D1. Trans-1,2-dichloroethylene and trichloroethylene decreased in well F1 from 130 ug/L to 22 ug/L and from 140 ug/L to 38 ug/L respectively. In well F2 trans-1,2-dichloroethylene and trichloroethylene decreased from 200 ug/L and 50 ug/L respectively to not detectable.

Vinyl chloride concentrations in wells F1 and F2 dropped from 140 ug/L to 38 ug/L and from 50 ug/L to not detectable respectively.

Sites A1 & A2 showed a small increase in the concentrations of some chloroethylenes. The concentrations of trans-dichloroethylene and vinyl chloride in E1 slightly increased to 161 ug/L and 42 ug/L, respectively. The changes do not indicate a strong source of chemicals in the vicinity of the wells. Vinyl chloride is thought to be produced by degradation of trichloroethylene.

A comparison of the concentrations of volatile chemicals obtained from bailed vs. pumped samples is shown in Table 5.2. The table also includes a comparison of ETC and OCC volatiles data for some of the wells. The comparison of ETC and OCC results showed excellent agreement. The bailed vs pumped results were variable, no effect was observed in the case of well F1, while pumping reduced the concentrations observed in E1. This limited data base makes it impossible to draw a firm conclusion relative to the merits of these sampling techniques.

During phase one, some chromatographic peaks were observed in the volatile scans for some wells. The cause of these peaks was not identified. Similar peaks were observed by OCC during the phase two analyses. They were also observed in blanks and standards analyzed immediately after samples. The mass spectra obtained did not represent compounds present in the water. It appears that these peaks are artifacts caused by column degradation. Unknown peaks were not present in the semi-volatile extracts of these samples.

## 5.2 Therminol Spill Area

Aroclor was detected above 50 ppm in the upper most samples at three locations, S, U and V and in the 3 foot depth sample at site S. These sites seem to be close to the limit of the therminol spill, but further sampling will be required to fully define the limit. The inherent variability of soil samples is the best explanation for the difference between the ETC and OCC results for the uppermost sample at site U. It may also show that average concentration is lower than 1800 ppm.

TABLE 3-1  
WATER DATA SUMMARY

Page 1 of 2

														Blanks		
Site		A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	E2/E1	E1/F2	F2/F1
Parameters	Units															
Temperature	°C	17.5	17.8	17.0	16.0	15.0	16.0	14.0	14.5	18.0	16.0	18.5	18.0	--	--	--
Turbidity	NTU	0.65	0.42	0.77	0.65	1.0	0.74	0.70	0.60	0.57	0.95	0.46	0.48	--	--	--
pH	--	5.7	5.6	6.9	6.5	6.4	6.6	6.1	7.0	6.6	7.0	6.85	6.9	--	--	--
Conductivity	umhos	160	73	145	193	90	130	115	135	300	217	300	280	--	--	--
Metals (ug/L)																
Barium		120	20	65	36	79	21	20	28	68	20	54	20	3	4	4
Cadium	ND3	ND3	ND3	ND3	ND3	30	ND3	ND3	ND3	ND3	ND3	ND3	ND3	ND3	ND3	ND3
Copper	20	ND8	ND8	ND8	ND8	ND8	ND8	ND8	ND8	ND8	ND8	ND8	ND8	ND8	ND8	ND8
Lead	ND90	ND90	ND90	ND90	ND90	ND90	ND90	ND90	ND90	ND90	ND90	ND90	ND90	ND90	ND90	ND90
Mercury	ND0.3	ND0.3	ND0.3	ND0.3	ND0.3	ND0.3	ND0.3	ND0.3	ND0.3	ND0.3	ND0.3	ND0.3	ND0.3	ND0.3	ND0.3	ND0.3
Zinc	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20
Water Quality mg/L																
COD		6	5	4	10	10	3	9	8	46	28	170	51	9	6	26
Nitrate		6.7	1.6	1.7	1.8	0.64	1.5	21	0.11	0.31	0.24	0.54	0.53	ND0.05	ND0.05	ND0.05
Phenols	ND0.005	ND0.005	ND0.005	ND0.005	ND0.005	ND0.005	ND0.005	ND0.005	ND0.005	ND0.005	ND0.005	ND0.005	ND0.005	ND0.005	ND0.005	ND0.005
Sulfate	35	21	23	21	16	59	12	ND2	44	3	10	5	ND2	ND2	ND2	ND2
TOC		1.4	1.1	1.4	ND1	ND1	ND1	ND1	ND1	12	4.2	43	8.7	ND1	1.8	ND2

TABLE 3-1  
WATER DATA SUMMARY

Page 2 of 2

													Blanks		
Site	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	E2/E1	E1/F2	F2/F1
Parameters	Units														
Volatile Organics ug/L															
1,1-dichloroethylene	ND2.8	ND2.8	ND2.8	ND2.8	ND2.8	ND2.8	ND2.8	ND2.8	ND2.8	ND2.8	ND2.8	ND2.8	ND2.8	ND2.8	ND2.8
Tetrachloroethylene	12	23	ND4.1	ND4.1	ND4.1	18	15	ND4.1	ND4.1	ND4.1	ND4.1	ND4.1	ND4.1	ND4.1	ND4.1
Toluene	ND6	ND6	ND6	ND6	ND6	ND6	ND6	ND6	ND6	ND6	ND6	ND6	ND6	ND6	ND6
1,2-transdichloro	3.4	14	ND1.6	ND1.6	ND1.6	ND1.6	ND1.6	ND1.6	161	ND1.6	22.3	ND1.6	ND1.6	ND1.6	ND1.6
trichloroethylene	ND1.9	27	ND1.9	3	11	4.1	ND1.9	ND1.9	7.6	ND1.9	ND1.9	ND1.9	ND1.9	ND1.9	ND1.9
vinyl chloride	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	42	ND10	38	ND10	ND10	ND10	ND10
styrene	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10
Phthalates															
Dimethyl	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20	ND20
Diethyl	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10
Dibutyl	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	16	ND10	ND10	ND10	ND10
Butyl Benzoyl	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10
bis(2-ethylhexyl)	ND10	ND10	ND10	ND10	ND10	15	ND10	52	11	ND10	17	21	19	ND10	ND10
Dioctyl	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10	ND10

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TABLE 3.2  
Concentration (mg/kg) <sup>\*</sup> of Aroclor 1248 vs Depth (ft)

<u>Depth (ft)</u>		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Site	S	900	NA	310	1.4	NA	0.44
	T	25	NA	1.5	ND <sub>0.1</sub>	NA	ND <sub>0.1</sub>
	U	1800/405	NA	0.17	ND <sub>0.1</sub>	NA	ND <sub>0.1</sub>
	V	50	NA	5	0.3	NA	NA

\* mg/kg = ppm, dry weight basis

TABLE 5.1

Groundwater Data - Ruco Plant site (1984/1985)<sup>1</sup>

Site		A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2
Parameter	Units												
Turbidity (1985)	NTU	0.65	0.42	0.77	0.65	1.0	0.74	0.70	0.60	0.57	0.95	0.46	0.48
pH	---	6.8/5.7	7.0/5.6	7.9/6.9	7.1/6.5	7.5/6.4	7.5/6.6	6.1/6.1	6.7/7.0	6.7/6.6	8.8/7.0	6.4/6.8	6.2/6.9
Conductivity	umhos	300/160	120/73	220/145	240/193	110/90	170/130	240/115	200/135	180/300	280/217	290/300	400/280
Cadmium	ug/L					/30							
Copper	ug/L	/20											
Lead	ug/L												
Mercury	ug/L												
Zinc	ug/L	64 (blank = 60)								84/			
Barium	ug/L	/120	/20	/65	/36	/79	/21	/20	/28	/68	/20	/54	/20
Nitrate	mg/L	1.3/6.7	1.7/1.6	1.1/1.7	2.2/1.2	1.1/0.6	1.2/1.5	/21	0.5/0.1	/0.3	/0.2	/0.3	0.2/0.5
Sulfate	mg/L	13/35	15/21	20/23	34/21	4/16	36/59	19/12	27/	/44	/3	4/10	3/5
Phenols	mg/L												
COD	mg/L	3/6	4/5	3/4	4/10	13/10	3/3	9/7	ND/8	25/46	15/28	46/170	66/51
TOC	mg/L	1.2/1.4	1.5/1.1	1.6/1.4	1.4/	4.2/	1.8/	2.4/	1.3/	0.2/12	0.7/4.2	22/43	14/8.7
1,1-Dichloroethylene	ug/L												
Tetrachloroethylene	ug/L	ND10/12	ND10/23				50/18	160/15					
Toluene	ug/L												
1,2-Trans-dichloroethylene	ug/L	ND10/3.4	ND10/14					24/ND10		30/161	130/22	200/ND10	
Trichloroethylene	ug/L	25/27			ND10/3	ND10/11	16/4.1			ND10/7.6			
Vinyl Chloride	ug/L									7/42		140/38	50/ND5
Styrene	ug/L												

<sup>1</sup> Values not shown were all Not Detected.

TABLE 5.2  
Organic Volatiles Analysis  
Bailed vs Pumped\* - ETC & OCC

	Site	D1		E1		E2		F1		F2	
		ETC	OCC	ETC	OCC	ETC	OCC	ETC	OCC	ETC	OCC
1,1-Dichloroethylene	1 **	ND/ND	---	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
Tetrachloroethylene	2	15/15	---	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
Toluene	3	15/15	---	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
1,2-Transdichloroethylene	4	ND/ND	---	161/83	170/64	ND/ND	ND/ND	22.3/25.5	16/22	ND/ND	ND/ND
Trichloroethylene	5	ND/ND	---	7.6/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
Vinyl Chloride	6	ND/ND	---	42/17.7	47/16	ND/ND	ND/ND	38/42.2	30/52	ND/ND	ND/ND
Styrene	7	ND/ND	---	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND

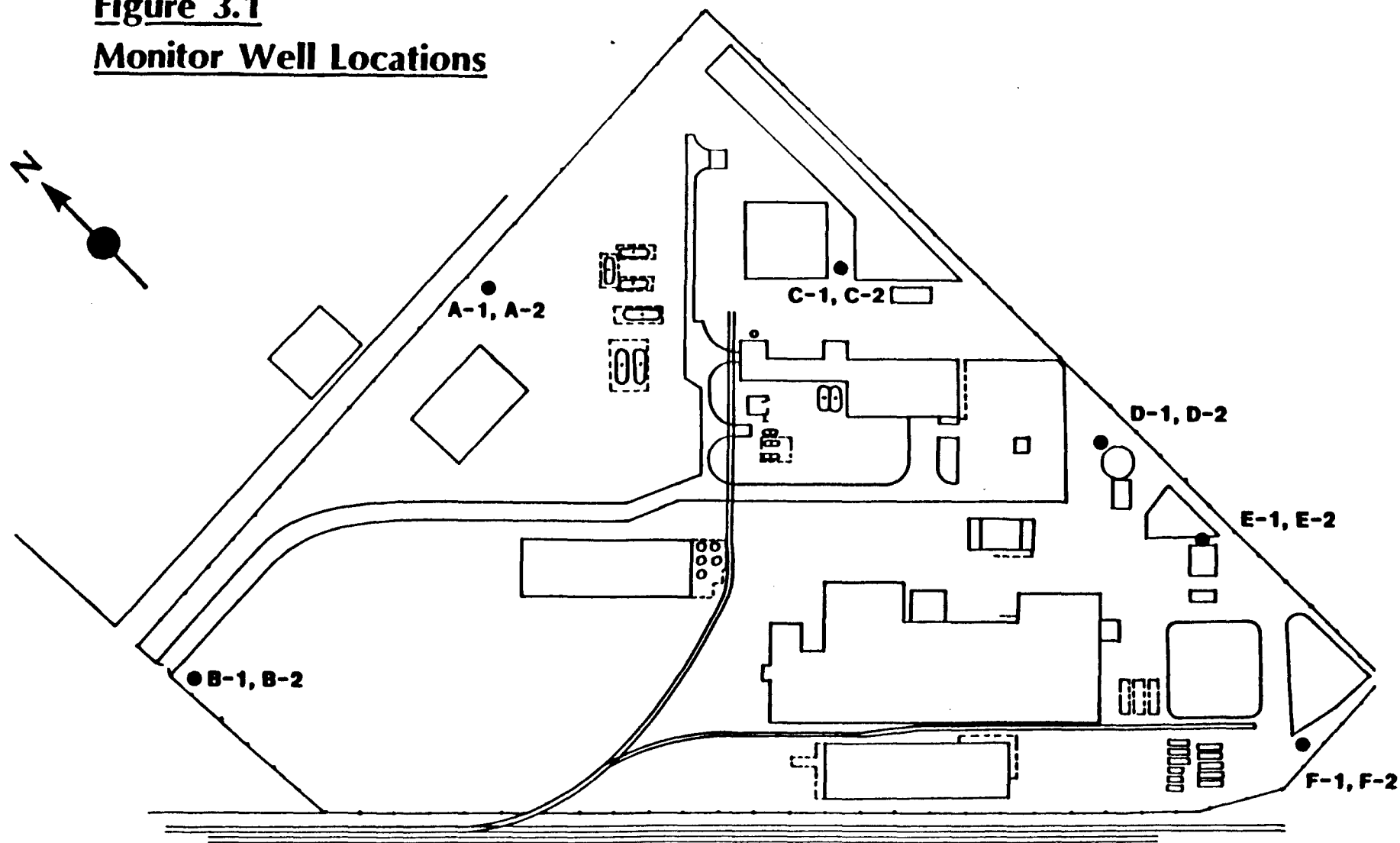
\* Bailed/Pumped sample collection technique

\*\* Same units and DL's as in TABLE 3.1

-- Analysis not done

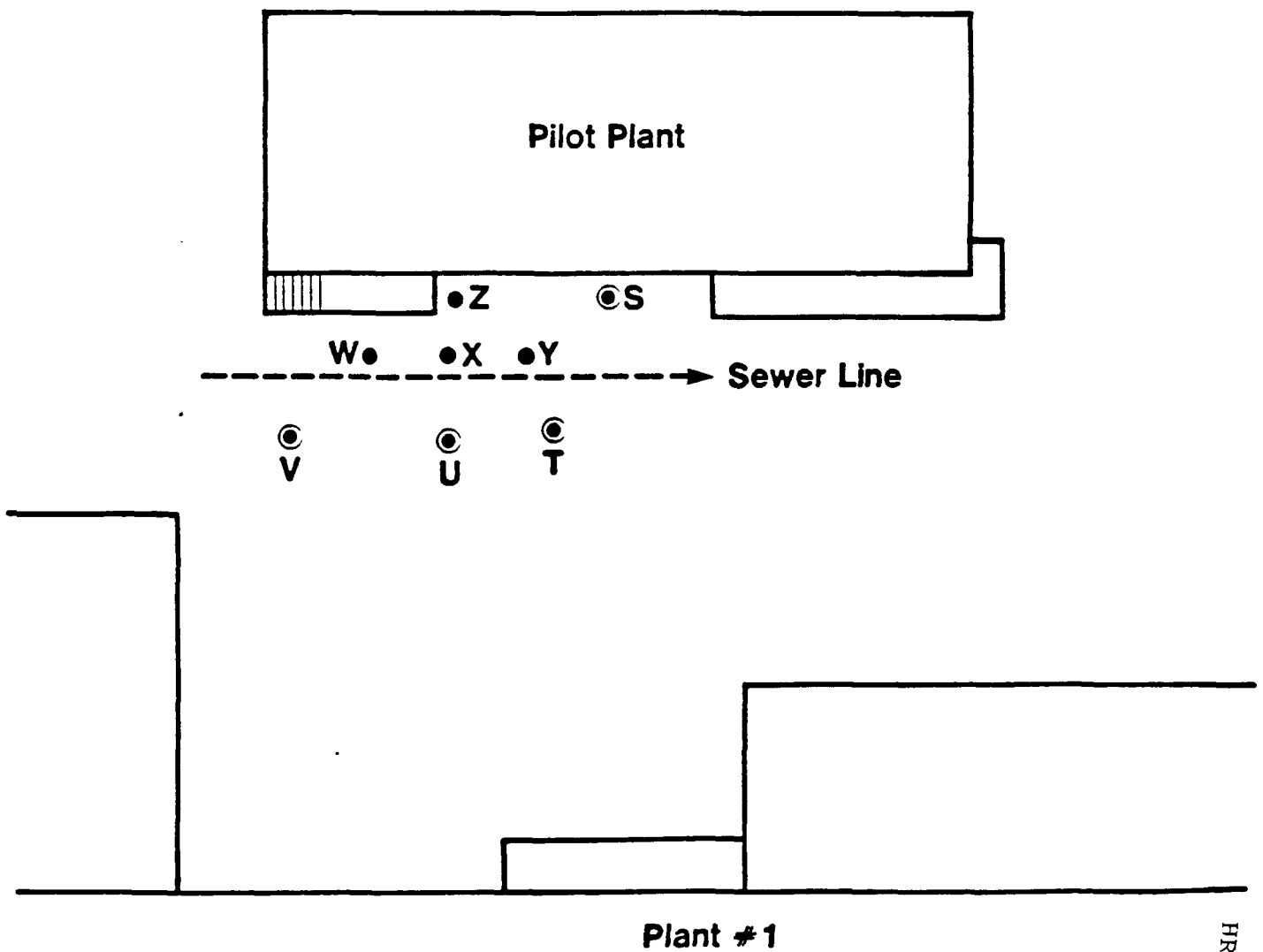
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**Figure 3.1**  
**Monitor Well Locations**



**Figure 3.2**  
**Thermal Spill Area**  
**Soil Boring Locations (Approximate)**

1 inch = 20 feet



**Legend**

- 1984 Borings
- ◎ 1985 Additional Borings

ATTACHMENT A

Methodology and Verification Reports



# Occidental Chemical Corporation

Research Center

# MEMO

To R. G. Badner Date January 9, 1985

From N. Simon

Subject ANALYSIS FOR MOCA (4,4'-METHYLENE BIS (O-CHLOROANILINE))  
AND PRIORITY POLLUTANT PHTHALATES IN WELL WATER FROM  
HICKSVILLE

COPIES: A. F. Weston, D. R. Thielen, S. Werner, A. Mack, TIC

## SUMMARY

Analyses of spiked aliquots of Test Well E1 and Milli-Q (blank) water demonstrated that MOCA and the EPA priority pollutant phthalates could be successfully recovered in either matrix.

## INTRODUCTION

Eight one-liter samples identified as Test Well E1 #1-8 were received 12/10/84. It was requested that spiking experiments be done to determine whether phthalates and MOCA could be recovered using EPA Method 625 for sample preparation and analysis.

## EXPERIMENTAL

### 1). Instrumental Parameters for Finnigan 4500 System

#### Gas Chromatographic Conditions (Finnigan 9610)

Column	- 25 m DB5-NB fused silica capillary (J&W).
Injection	- Grob, 60/1 split after 60 seconds.
Carrier	- Helium 18 psi
Injector Temp.	- 285°C
Detector Temp.	- 285°C
GC/MS	- 50° to 280° at 15°/ min. after a 2 min. hold at 50°, hold at 280° till baseline clean.

#### Mass Spectrometer Conditions (Finnigan 4500)

Instrument	- Finnigan 4500 GC/MS interfaced with an Incos Data Acquisition System.
Source Parameters	- 90°, Electron Impact Source with 70 eV ionizing electrons.

HRC 001 0607

R. G. Badger  
ANALYSIS FOR MOCA (4,4'-METHYLEN BIS (O-CHLOROANILINE)  
AND PRIORITY POLLUTANT PHTHALATES IN WELL WATER FROM  
HICKSVILLE  
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EM Volts - 1580 volts  
Scan Parameters - Total scan sequence - .5 second consisting of  
acquisition during .45 sec. up scan, .05 sec. hold  
at bottom. Mass range scanned 350-50.

## 2). Sample Preparation

Twenty-five microliters of a 2 mg/ml solution of 2-fluoronaphthalene in methanol were added to each sample. For the base neutral extraction, one liter of sample was adjusted to pH 11 with 6N NaOH; extracted three times with methylene chloride according to EPA Protocol; dried through a sodium sulfate column; and concentrated to 5 ml using a Kuderna-Danish evaporator and nitrogen.

5 ul of an internal standard mix, containing eight isotopically labelled compounds was added to each one ml of extract.

## 3). Standard Preparation

Standards were prepared from pure materials. The priority pollutant compounds were received with purity identified from Chem Service, Inc., and identified as "EPA 'Consent Decree' or 'Flannery' Priority Pollutants Kit". MOCA was received from Hicksville. Purity was not identified.

Each component was weighed into a volumetric and diluted with methylene chloride. Weights were corrected for any component under 99% purity. The stock solutions were combined to give a concentration factor for each component of approximately one hundred times the necessary instrument detection limit. Dilutions were made in methylene chloride to give standards of approximately 10, 5, 2, and 1 times the instrument detection limit.

The spiking solution was prepared the same way, except that methanol was used as the solvent. No dilutions were required.

## RESULTS AND DISCUSSION

Results are summarized in Table I. They demonstrate that the Priority Pollutant Phthalates and MOCA could be recovered in Test Well E1 as well as in Milli-Q water.

Di-n-octylphthalate was the only priority pollutant phthalate not examined in the study. It was determined during the study that Chem Services, our supplier for pure standards, had misidentified Bis(2-ethylhexyl)phthalate (dioctylphthalate) as di-n-octylphthalate. It is reasonable to assume that recoveries would be similar to those for bis(2-ethylhexyl)phthalate.

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R. G. Badger  
ANALYSIS FOR MOCA 4,4'-METHYLENE BIS (p-CHLOROANILANE)  
AND PRIORITY POLLUTANT PHTHALATES IN WELL WATER FROM  
HICKSVILLE  
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Recoveries from the phthalates and MOCA were good in both well water and Milli-Q (blank) water. This appeared to be the result of both trace levels (less than our quantitation limit of 10 ug/L) of phthalates in the unspiked samples and some deviations from straight-line functions in the standard curves generated.

Accuracy could possibly be improved by more closely bracketing unknown concentrations with standards and by determining the trace levels in the unspiked aliquots. Either change would, however, dramatically increase the cost and time required for analyses.

The recoveries reported are good for this method. They do demonstrate that the phthalates and MOCA can be recovered in Well E1. Further verification is not necessary.



---

Nan Simon  
Associate Chemist  
Central Sciences

/jb  
Attachment

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TABLE

Compound	Well E1 #2 ug/L	E1 #4 Spiked at ug/L	E1 #3		E1 #1		E1 #1		E1 #1	
			Amount Recovered	% Recovery	Spiked at ug/L	Amount Recovered	% Recovery	Spiked at ug/L	Amount Recovered	% Recovery
dimethylphthalate	ND <sub>10</sub>	31	32	100	31	37	120	79	74	94
diethylphthalate	ND <sub>10</sub>	21	24	110	21	27	130	52	55	110
dibutylphthalate	10	21	37	130(1)	21	40	140(1)	53	72	120(1)
butylbenzylphthalate	ND <sub>10</sub>	22	23	100	22	26	120	55	65	120
bis(2-ethylhexyl)phthalate	ND <sub>10</sub>	43	38	88	43	27	63	108	48	44
4,4'-methylene bis(o-chloroaniline)	ND <sub>10</sub>	20	20	100	30	24	120	49	71	140
Surrogate Recovery %	66			73			70			73

<u>Compound</u>	<u>Blank ug/L</u>	<u>Blank Spiked at ug/L</u>	<u>Amount Recovered</u>	<u>% Recovery</u>	<u>Blank Spiked at ug/L</u>	<u>Amount Recovered</u>	<u>% Recovery</u>	<u>Blank Spiked at ug/L</u>	<u>Amount Recovered</u>	<u>% Recovery</u>
dimethylphthalate	ND <sub>10</sub>	31	33	110	31	30	97	79	58	73
diethylphthalate	ND <sub>10</sub>	21	23	110	21	25	120	52	48	92
dibutylphthalate	ND <sub>10</sub>	21	25	120	21	33	160	53	64	120
butylbenzylphthalate	ND <sub>10</sub>	22	21	95	22	30	140	55	75	140
bis(2-ethylhexyl)phthalate	ND <sub>10</sub>	43	83	190	43	59	140	108	120	110
4,4'-methylene bis(o-chloroaniline)	ND <sub>10</sub>	20	20	100	30	20	150	49	77	160
Surrogate Recovery %	61			69			79			80

	Summary of % Recovery in Well E1					Summary of % Recovery in Mill-Q Water					EPA Acceptance (2) Criteria if Spiked at 100 ug/L
				X (3)	S (4)				X (3)	S (4)	X
dimethylphthalate	100	120	94	100	14	110	97	73	93	19	D-112
diethylphthalate	110	130	110	120	12	110	120	92	110	14	D-114
dibutylphthalate	130	140	120	130	10	120	160	120	130	23	I-118
butylbenzylphthalate	100	120	120	110	12	95	140	140	120	26	D-152
bis(2-ethylhexyl)phthalate	88	63	44	65	22	190	140	110	150	40	B-158
4,4'-methylene bis(o-chloroaniline)	100	120	140	120	20	100	150	160	140	32	

(1) Corrected for concentration in unspiked sample.

(2) Method 625, October, 1984.

(3)  $\bar{X}$  = mean for 3 analyses.

(4) S = standard deviation of 3 analyses.

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**MEMO**

**To** R. G. Badger

**Date** November 4, 1985

**From** N. Simon

**CC:** S. A. Sojka  
A. F. Weston  
D. R. Thielen  
TIC

**Subject** GC/MS ANALYSIS OF HICKSVILLE WATER SAMPLES FOR  
VOLATILE ORGANICS, PHTHALATES, MOCA AND STYRENE

#### SUMMARY

Vinyl Chloride, trans-1,2-dichloroethylene, dibutyl phthalate and bis(2-ethylhexyl) phthalate were found in some water samples. No other monitored parameter was detected at or above 10 ug/L for volatiles and phthalates and 20 ug/L for methylene bis(o-chloroaniline) (MOCA).

Some of the chromatograms obtained indicated that other organics were present. It appears the spectra obtained represent artifacts of the analysis rather than the compounds as they were present in the samples.

#### INTRODUCTION

Samples were taken between 5/3/85 and 5/10/85. They were received in the lab between 5/8 and 5/13/85. Analyses were completed within the allowed holding times using modifications of EPA Methods 624 and 625.

#### EXPERIMENTAL

Methodology has been documented in previous memos: Sept. 29, 1982 to A.F. Weston from N. Simon, January 9, 1985 to R. G. Badger from N. Simon.

Modifications included the use of an HP5985 with RTE6 data system for many of the extractable samples instead of the Finnigan 4000; the addition of surrogates to all samples, and; the use of chemical ionization mass spectrometry for confirmation of the molecular weights of the unknowns.

#### SAMPLE ACCOUNTING

A sample accounting log is included as Appendix 1. It details sample identification, dates of sampling, preparation and analysis and a description of samples that appeared noteworthy.

#### RESULTS AND DISCUSSION

Results are summarized in the following tables (I-IV). Table I gives the results for volatiles including styrene. The last two lines under each sample heading give the recovery in the sample of the isotopically labelled surrogates added prior to introduction of the sample into the purge and trap device. Aliquots of Well E2 bailed and Bailed Well F2 were spiked with all the monitored parameters. Recoveries are reported.

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GC/MS ANALYSIS OF HICKSVILLE WATER SAMPLES FOR  
VOLATILE ORGANICS, PHTHALATES, MOCA AND STYRENE  
October 2, 1985

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In addition to the analysis for specified volatiles, all samples were screened for other volatile priority pollutants. None were detected. Recoveries for those compounds are reported in Table II.


Table III lists the results for MOCA and the specified phthalates. The last five lines under each sample heading gives the recovery in the sample of the surrogates added prior to sample extraction.

Table IV lists the recoveries for the phthalates spiked into samples from Wells E1, F1 and a blank. Recoveries for spiked compounds in extractable samples were acceptable by EPA Method 625 QC criteria with the exception of Bis(2-ethyl hexyl)phthalate in Well F1. Bis(2-ethyl hexyl)phthalate can be present in sampling equipment, sample bottles, lab reagents, etc. Its sources in the lab are being investigated. There is no EPA criterion for the recovery of MOCA. Previous work in this lab indicated that MOCA was recovered in well water from Hicksville at or above 100%. Results from this study showed that MOCA was recovered at 40% in a sample blank and 84% in a Milli-Q water reagent blank.

There is no report of recovery of MOCA in authentic samples. The first set of spiked samples, E1 and F1 were spiked at, rather than above, the detection limit for MOCA. 100% recovery would have been required to detect it. Once the error was recognized, a sample was chosen at random for spiking at a more appropriate level. It was determined after analyses were completed that the sample was a field blank.

It was noted during the analyses for volatiles that a pattern of poorly resolved peaks, frequently larger than the internal standards were found at the end of the chromatograms. They were also present in blanks and standards analyzed after samples, regardless of steps taken to reduce carry over. The spectra obtained are not believed to represent compounds as they were present in the water. It appears that compounds in the water stripped the chromatographic columns used for the analysis and the spectra, therefore, represent artifacts rather than authentic compounds present in the water.

Further evidence for this explanation was found in the analyses for extractables (phthalates and MOCA). If the peaks found at the end of the volatile chromatograms represented compounds in the water, they would be expected to appear early in the chromatograms from the extracts. This did not appear to be the case.

  
\_\_\_\_\_

Nan Simon  
Chemist  
Central Sciences

/jb  
Attachments

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TABLE 1

Volatile Parameters (ug/L)

<u>Volatile Parameters</u>	Pumped Well E2 H6115	Bailed Well E2 H6123	Pumped H6111 Well F2	Bailed G9561 Well F2	Bailed Well E1 H6119	Pumped Well E1 H6125	Pumped Well F1 H6120	Bailed G9567 Well F1	M1111-Q Blanks
1,1-Dichloroethylene	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>
Tetrachloroethylene	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>
Toluene	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>
Trans-1,2-Dichloroethylene	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	(1)/170	64	22	16	ND <sub>10</sub>
Trichloroethylene	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>
Vinyl Chloride	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	45/50	16	52	30	ND <sub>10</sub>
Styrene	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>
<u>Surrogate Recoveries</u>									
d <sub>6</sub> -benzene	99	94	102	99	97/99	103	102	104	107/98
d <sub>5</sub> -chlorobenzene	88	92	98	92	91/93	99	102	92	112/96

(1) Concentration exceeded calibrated range, sample diluted and reanalyzed.

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TABLE 1 (Cont'd.)

Spike Recoveries - Volatiles

<u>Volatile Parameters</u>	H6123 Spike at 32 ug/L in Bailed E2	% Recovery	G9561 Spike at 32 ug/L in Bailed F <sub>2</sub>	% Recovery	624 QC Acceptance Criteria (% Recovery)
1,1-Dichloroethylene	34	106	29	91	D-234 <sup>1</sup>
Tetrachloroethylene	42	130	32	100	64-148
Toluene	33	103	31	97	47-150
Trans-1,2-Dichloroethylene	36	112	32	100	54-156
Trichloroethylene	36	112	30	94	71-157
Vinyl Chloride	33	103	29	91	D-251 <sup>1</sup>
Styrene	32	100	27	84	
<u>Surrogate Recoveries</u>					
d <sub>6</sub> -benzene		102		106	
d <sub>5</sub> -chlorobenzene		100		105	

<sup>1</sup> D indicates parameter must be detected.

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TABLE II  
Other Volatile Priority Pollutants

	H6123 Spike at 32 ug/L in Bailed E2 ug/L	% Recovery %	G9561 Spike at 32 ug/L in Bailed F2 ug/L	% Recovery %
Chloromethane	29	91	25	78
Bromomethane	20	63	10	31
Chloroethane	33	103	29	91
Methylene Chloride	29	91	21	66
1,1-Dichloroethane	35	109	30	94
Chloroform	35	109	30	94
1,2-Dichloroethane	33	103	28	88
1,1,1-Trichloroethane	37	116	32	100
Carbon Tetrachloride	37	116	32	100
Bromodichloromethane	34	106	29	91
1,2-Dichloropropane	34	106	27	84
Trans-1,2-Dichloropropene	24	75	14	44
Dibromochloromethane	33	103	27	84
Cis-1,3-Dichloropropene	36	112	29	91
Bromoform	34	106	26	81
1,1,2,2-Tetrachloroethane	37	116	27	84
Chlorobenzene	34	106	30	94
Ethyl Benzene	35	109	30	94

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ABL 1  
MOCA & Phthalates  
(ug/L)

	Well A2 G9570	Well A1 G9571	Well C1 G9569	Well B1 G9562	Well B2 G9563	Well C2 G9568	Well E2 H6128	E1/F2 Blank G9560	Well F2 G9561	Well D1 G9564
MOCA	ND <sub>20</sub>	ND <sub>20</sub>	ND <sub>20</sub>	ND <sub>20</sub>	ND <sub>20</sub>	ND <sub>20</sub>	ND <sub>20</sub>	ND <sub>20</sub>	ND <sub>20</sub>	ND <sub>20</sub>
Dimethyl phthalate	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>
Diethyl phthalate	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>
Dibutyl phthalate	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>
Butyl Benzyl Phthalate	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>
Bis(2-ethylhexyl)phthalate	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	15	ND <sub>10</sub>	ND <sub>10</sub>	21	ND <sub>10</sub>
Dioctyl Phthalate	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>
<u>Surrogates (% Recovery)</u>										
d <sub>8</sub> -naphthalene	80	96	120	91	65	94	91	57	43	71
1-Fluoronaphthalene	70	87	100	77	58	89	81	50	36	61
2-Fluorobiphenyl	80	89	110	90	76	100	93	62	54	80
d <sub>10</sub> -biphenyl	85	96	120	95	75	97	88	62	52	81
d <sub>10</sub> -acenaphthene	84	93	110	100	87	110	95	73	69	94

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Table II. Cont.

MOCA & Phthalates

	<u>Well D2</u> <u>G9565</u>	<u>E2/E1</u> <u>Blank</u> <u>G9558</u>	<u>Well E1</u> <u>G9559</u>	<u>F2/F1</u> <u>Blank</u> <u>G9566</u>	<u>Well F1</u> <u>G9567</u>	<u>M1111-Q</u> <u>Blank</u>	<u>Tap Water</u> <u>Blank</u>
MOCA	ND <sub>20</sub>	ND <sub>20</sub>	ND <sub>20</sub>	ND <sub>20</sub>	ND <sub>20</sub>	ND <sub>20</sub>	ND <sub>20</sub>
Dimethyl Phthalate	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>
Diethyl Phthalate	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>
Dibutyl Phthalate	ND <sub>10</sub>	ND <sub>10</sub>	16	ND <sub>10</sub>	16	ND <sub>10</sub>	ND <sub>10</sub>
Butyl Benzyl Phthalate	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>
Bis(2-ethylhexyl)phthalate	52	19	11	ND <sub>10</sub>	17	ND <sub>10</sub>	13
dioctyl Phthalate	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>	ND <sub>10</sub>
<u>Surrogates (% Recovery)</u>							
d <sub>8</sub> -naphthalene	87	64	62	56	39	84	62
1-Fluoronaphthalene	72	51	48	46	32	78	46
2-Fluorobiphenyl	91	63	68	65	48	85	57
d <sub>10</sub> -biphenyl	92	70	69	67	50	87	62
d <sub>10</sub> -Acenaphthene	94	80	75	71	60	96	73

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TAB v

**Spike Recoveries of Phthalates & MOCA**

	Well E1 G9559 Spiked at 20 ug/L Conc. <u>Detected</u>	Conc. in Unspiked <u>Sample</u>	% Rec.	Well F1 G9567 Spiked at 20 ug/L Conc. <u>Detected</u>	Conc. in Unspiked <u>Sample</u>	% Rec.	M1111-Q Water Spiked at 20 ug/L Conc. <u>Detected</u>	Conc. in Unspiked <u>Sample</u>	% Rec.
Dimethyl Phthalate	13	ND <sub>10</sub>	65	15	ND <sub>10</sub>	65	15	ND <sub>10</sub>	75
Diethyl Phthalate	15	ND <sub>10</sub>	75	17	ND <sub>10</sub>	85	18	ND <sub>10</sub>	90
Dibutyl Phthalate	22	16	30	24	16	40	23	ND <sub>10</sub>	120
Butyl Benzyl Phthalate	14	ND <sub>10</sub>	70	17	ND <sub>10</sub>	85	24	ND <sub>10</sub>	120
Bis(2-ethylhexyl)phthalate	14	11	15	62	17	220	25	ND <sub>10</sub>	120
Diocetyl Phthalate	11	ND <sub>10</sub>	55	17	ND <sub>10</sub>	85	24	ND <sub>10</sub>	120
<u>Surrogates (% Recovery)</u>									
d <sub>8</sub> -naphthalene			70			54			65
1-Fluoronaphthalene			59			50			58
2-Fluorobiphenyl			64			60			73
d <sub>10</sub> -biphenyl			67			63			69
d <sub>10</sub> -Acenaphthene			75			64			74

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**Spike Recoveries of Phthalates & MOCA<sup>1</sup>**

	Blank E1/F2 G9560 Spiked at 50 ug/L Conc. Detected	Conc. in Unspiked Sample	% Rec.	Milli-Q Water Spiked at 50 ug/L Conc. Detected	Conc. in Unspiked Sample	% Rec.	625 QC Acceptance Criteria (% Recovery)
MOCA	20	ND <sub>20</sub>	40	42	ND <sub>20</sub>	84	
Dimethyl Phthalate	48	ND <sub>10</sub>	96	44	ND <sub>10</sub>	88	D-112
Diethyl Phthalate	50	ND <sub>10</sub>	100	52	ND <sub>10</sub>	100	D-114
Dibutyl Phthalate	58	ND <sub>10</sub>	120	58	ND <sub>10</sub>	120	1-118
Butyl Benzyl Phthalate	56	ND <sub>10</sub>	110	46	ND <sub>10</sub>	92	D-152
Diocetyl Phthalate	57	ND <sub>10</sub>	110	46	ND <sub>10</sub>	92	4-146
<u>Surrogates (% Recovery)</u>							
d <sub>8</sub> -naphthalene			71			68	
1-Fluoronaphthalene			68			61	
2-Fluorobiphenyl			75			66	
d <sub>10</sub> -bipheyl			74			68	
d <sub>10</sub> -Acenaphthene			71			70	

<sup>1</sup> Bis(2-ethyl hexyl)phthalate was not caluclated - extracts or samples were contaminated in the lab.

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**SAMPLE ACCOUNTING LOG**

<u>Well</u>	<u>Sample I.D.</u>	<u>Bottle</u>	<u>Date Sampled</u>	<u>Date Received</u>	<u>Date Extracted</u>	<u>Date Analyzed</u>	<u>Analysis Required</u>	<u>C.S. Log #</u>	<u>Comments</u>
A2	G9570	A4079	5/6	5/7			BN		
A2	G9570	A4080	5/6	5/7	5/9	5/16	BN	50532	slightly brown-solid present
A1	G9571	A4081	5/6	5/7	5/9	5/16	BN	50533	
A1	G9571	A4982	5/6	5/7			BN		
B2	G9563	A4124	5/7	5/8	5/15	5/17	BN		
B2	G9563	A4125	5/7	5/8			BN		
B1	G9562	A4126	5/7	5/8	5/15	5/17	BN	50551	
B1	G9562	A4127	5/7	5/8			BN		
C1	G9569	A4128	5/7	5/8	5/9	5/16	BN	50334	
C1	G9569	A4129	5/7	5/8			BN		
C2	G9568	A4130	5/7	5/8	5/15	5/17	BN	50553	
C2	G9568	A4131	5/7	5/8			BN		
E2	H6128	A4136	5/8	5/9	5/15	5/17	BN	50554	cloudy brown liquid
E2	H6129	A4137	5/8	5/9			BN		
E2	H6115 pumped	A4138	5/8	5/9			VOA		
E2	H6115 pumped	A4139	5/8	5/9		5/13	VOA	50540	
E2	H6123 bailed	A4140	5/8	5/9		5/13	VOA	50541	5054ISP Spiked @ 32.2 ug/L
D2	G9565	A4141	5/8	5/9			VOA		
D2	G9565	A4142	5/8	5/9	5/15	5/18	BN	50561	cloudy light brown liquid
D2	G9565	A4143	5/8	5/9			BN		
D1	G9564	A4144	5/8	5/9	5/15	5/17	BN	50560	
D1	G9564	A4145	5/8	5/9			BN		
F2	H6111 pumped	A4151	5/9	5/10		5/14	VOA	50544	
F2	H6111 pumped	A4152	5/9	5/10			VOA		
F2	G9561 bailed	A4153	5/9	5/10			VOA		
F2	G9561 bailed	A4154	5/9	5/10		5/14	VOA	50546	50546SP spiked @32.2 ug/L

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Appendix 1 (Cont'd.)

SAMPLE ACCOUNTING LOG

<u>Well</u>	<u>Sample I.D.</u>	<u>Bottle</u>	<u>Date Sampled</u>	<u>Date Received</u>	<u>Date Extracted</u>	<u>Date Analyzed</u>	<u>Analysis Required</u>	<u>C.S. Log #</u>	<u>Comments</u>
F2	G9561	A4155	5/9	5/10	5/15	5/17	BN		Cloudy brown liquid
F2	G9561	A4156	5/9	5/10			BN		
Blank	G9560 E1/F2	A4157	5/9	5/10	5/15	5/17	BN	50558	
Blank	G9560 E1/F2	A4158	5/9	5/10	5/21	7/9	BN	50576	Spiked at 50 ug/L
E1	H6119 bailed	A4159	5/9	5/10		5/13	VOA	50542	50542 DIL 1:5 DIL
E1	H6119 bailed	A4160	5/9	5/10			VOA		
E1	H6125 pumped	A4161	5/9	5/10		5/14	VOA	50543	
E1	H6125 pumped	A4162	5/9	5/10			VOA		
E1	G9559	A4163	5/9	5/10	5/16	5/18	BN	50563	
E1	G9559	A4164	5/9	5/10	5/16	5/17	BN	50564	Spiked with 20 ug/L
Blank	G9558 E2/E1	A4165	5/9	5/10	5/16	5/18	BN	50562	
Blank	G9558 E2/E1	A4166	5/9	5/10	5/29	7/9	BN	50600	
F1	H6120 pumped	A4167	5/9	5/10		5/13	VOA	50539	
F1	H6120 pumped	A4168	5/9	5/10			VOA		
F1	G9567 bailed	A4169	5/9	5/10			VOA		
F1	G9567 bailed	A4170	5/9	5/10		5/14	VOA	50545	
F1	G9567	A4171	5/3	5/13	5/16	5/18	BN	50567	Cloudy with Red/Brown precipitate
F1	H9567	A4172	5/3	5/13	5/16	5/18	BN	50568	
Blank	G9566 F2/F1	A4173	5/3	5/13	5/16	5/18	BN	50566	
Blank	G9566 F2/F1	A4174	5/3	5/13			BN		
	Tap Water		5/16	5/16	5/16	5/18	BN	50565	
	Milli-Q Water		5/16	5/16	5/16	5/18	BN	50569	Spiked at 20 ug/L
	Milli-Q Water		5/21	5/21	5/21	7/9	BN	50575	Spiked at 50 ug/L
	Milli-Q Water		5/29	5/29	5/29	7/9	BN	50599	

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Research Center

# MEMO

To R. G. Badger  
From C. C. Sommer  
Subject ANALYSIS OF HICKSVILLE SOIL SAMPLE FOR PCBs

Date May 7, 1985

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### SUMMARY

A soil sample was submitted for analysis of polychlorinated biphenyls (PCBs) by gas chromatography with electron capture detection (GC/EC). The sample was analyzed for the Aroclor series; 1016, 1221, 1232, 1242, 1248, 1254 and 1260. Aroclor 1248 was found at a level of 405 mg/Kg, dry weight.

### INTRODUCTION

A soil sample from the Hicksville site was submitted for PCBs analysis March 22, 1985. The sample consisted of one liter of free flowing, black soil. Duplicate samples were extracted using an EPA method for organochlorine pesticides in soil and house dust (1). In addition, a blank soil and a spiked blank soil fortified with 200 ug/Kg of Aroclor 1248 were analyzed to provide method recovery information. The extracts were analyzed by capillary GC/EC. This report presents the results of these analyses.

### EXPERIMENTAL

Prior to extraction for PCBs, the sample was passed through a U.S. Standard No. 8 sieve, homogenized, and the percent moisture determined. A 100 gram sample of blank soil was fortified at 200 ug/Kg level. Fifty grams of each sample was placed into a precleaned extraction thimble. The samples were then extracted with 150 ml of a 1:1 solution of hexane-acetone in a soxhlet apparatus for 24 hours. The resulting extracts were passed through an anhydrous sodium sulfate column to remove residual water and reduced to a volume of 10 ml using a Kuderna-Danish (KD) apparatus. The extracts were analyzed by GC/EC to ascertain whether further clean-up was necessary. The chromatographic conditions are given below.

#### Chromatographic Conditions

Instrument	- HP 5840
Column	- 30m x 0.25 mm i.d. DB-5 fused silica capillary column (J&W scientific)

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Temperature Program	- Hold at 140°C for 2 minutes, then ramp at 2.0°C per minute to 190°C and hold for 5 minutes, then ramp to 1°C per minute to 240°C.
Injector Mode	- Splitless
Injector Temperature	- 200°C
Detector	- Ni <sup>63</sup> Electron Capture
Detector Temperature	- 300°C
Carrier Gas	- He at 3 ml/minute
Makeup Gas	- 5% Methane in Argon at 40 ml/minute

The instrument was found to have a linear range of 50 to 1000 ug/L. If the sample concentration was found to be out of the calibrated range, the sample was diluted and reanalyzed.

#### RESULTS AND DISCUSSION

The results of duplicate analyses of the soil sample are given in Table 1. Method recovery data for the blank soils is given in Table 2. The recovery from the spiked blank soil was very good. No spike of the sample was done due to the amount of PCBs present.

It was found that the soxhlet thimbles required cleaning prior to use to eliminate interferences. This was done by extracting the empty thimble before use. The samples extracted with the cleaned thimbles did not require further cleanup.

#### REFERENCES

- (1) Organochlorine Insecticides in Soils and Housedust, in "Manual of Analytical Methods for the Analysis of Pesticides in Humans and Environmental Samples", EPA-600/8-80-038, June 1980.

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Attachments

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TABLE 1

Results of Duplicate Analyses of Hicksville Soil  
(in mg/Kg, dry weight)

<u>Aroclors</u>	<u>Sample #1</u>	<u>Sample #2</u>
1016	ND <sub>0.1</sub>	ND <sub>0.1</sub>
1221	ND <sub>0.1</sub>	ND <sub>0.1</sub>
1232	ND <sub>0.1</sub>	ND <sub>0.1</sub>
1242	ND <sub>0.1</sub>	ND <sub>0.1</sub>
1248	405	420
1256	ND <sub>0.1</sub>	ND <sub>0.1</sub>
1260	ND <sub>0.1</sub>	ND <sub>0.1</sub>

TABLE 2

Recovery of Aroclor 1248 from Blank Soil

	<u>Original</u>	<u>Added</u>	<u>Expected</u>	<u>Found</u>	<u>%</u>
Blank Soil	ND <sub>.1</sub>	0.0	ND <sub>.1</sub>	ND <sub>.1</sub>	-
Spiked Blank Soil	ND <sub>.1</sub>	0.20	0.20	0.23	115%

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ETC Reports

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REPORT OF GROUNDWATER AND SOILS INVESTIGATION  
AT THE FORMER RUCO DIVISION PLANT SITE - HICKSVILLE, N.Y.

2nd Round of Sampling

Section III

Analytical Chemistry

February 1986

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## I N D E X

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## 1.0 INTRODUCTION

This report describes the results of the analysis of groundwater and soil samples taken at the former Ruco Division Plant site in Hicksville, New York, March 18-21, 1985. This is the second phase of a study of groundwater conditions at the Ruco Plant. The first phase was reported in October 1984 in "Report of Groundwater and Soils Investigation at the Former Ruco Division Plant site, Hicksville, New York". (1984 Report)

## 2.0 CONCLUSIONS

- o The results do not indicate a major source of chemicals from the plant site.
- o The changes in the concentrations of chemicals found in the well clusters are best explained as pockets of contaminated water flowing across the plant site.
- o The chemical concentrations observed do not present a cause for concern.
- o No further monitoring or investigation of plant site groundwater is necessary.
- o Further limited sampling of the therminol spill area is suggested.
- o A comparison with the 1984 data showed good agreement for general water quality parameters.
- o No groundwater chemical concentrations were over 50 ppb.
- o Vinyl chloride was found at concentrations of 41.6 and 38 ppb at sites E1 and F1 respectively.
- o PCBs were not found in the groundwater. Those present in samples were a result of sample contamination, either in the field or laboratory.
- o The extent of the therminol spill area has been nearly delineated.

## 3.0 ANALYTICAL CHEMISTRY

### 3.1 Introduction

Groundwater samples were taken March 18-21, 1985 by Leggett, Brashears & Graham (LB&G) personnel from 12 wells located as shown in

Figure 3.1. Soil samples were taken at four sites generally at four depths each, in the area of the therminol spill. The approximate sampling locations are shown in Figure 3.2.

The analyses of groundwater for volatiles and soils for Aroclor 1248 were conducted by the ETC Laboratory, Edison, N.J. The analysis of groundwater for phthalates and MOCA was conducted by the Occidental Chemical Corporation (OCC) laboratory at Grand Island, NY. Five duplicate groundwater samples for volatiles and one duplicate soil for Aroclor 1248 were analyzed by the OCC laboratory. These samples were analyzed as part of the quality assurance program for the project.

Analyses for metals and inorganics were performed by the ETC lab except for Sulfate, Nitrate, COD and Phenols which were sub-contracted to Chyun. Turbidity, pH, temperature and conductivity measurements were made in the field by LB&G.

### 3.2 ETC Results

The groundwater results are shown in Table 3.1. The analytical methods used were the same as those used for the first part of the program (1984 Report).

These methods are given in detail in the ETC reports. A complete set of the ETC reports is available in Appendix A (bound separately). The Therminol spill area soil results are shown in Table 3.2. The method used was the same as that used for the first part of the program (1984 Report). Details of the analysis and the results are given in the ETC reports, Appendix A.

### 3.3 OCC Results

The results of analysis of groundwater for phthalates are also included in Table 3.1. The methodology used was EPA 625, modified to include 4,4'-methylene bis(o-chloroaniline) (MOCA). The method was verified using a sample from Well E1 prior to the second round of sampling. Details are given in Attachment A. The report of the analysis of phase two samples for phthalates, MOCA and volatiles is given in Attachment A. The OCC methodology for volatiles was EPA 624, the same methodology as used by ETC. OCC used EPA 608 for the analysis of the soil sample for Aroclors (Attachment A).

#### 4.0 QUALITY ASSURANCE

##### 4.1 ETC

A review of the Hicksville analytical program was made in December 1985 at the ETC laboratory by OCC personnel. In general, all analyses were performed in accordance with the requirements of the study. The detection limits for volatiles were reduced from 10 ug/L as used in the first phase to compound specific detection limits (generally 2 to 6 ug/L) as currently defined by EPA protocol.

Quality control data indicate that no major problems existed in the analytical program. The performance of the laboratory was satisfactory.

##### 4.2 OCC

A quality assurance review of the Hicksville Analytical program was made at the OCC laboratory in December 1985. In general, all analyses were performed in accordance with the requirements of the study.

Documentation was complete for all phases of the quality assurance program including chain of custody analytical methodology, calibration and quality control.

Quality control data indicate that no major problems existed in the analytical program. Low levels of two phthalates were found in five samples. Bis(2-ethylhexyl)phthalate was found in a blank at a concentration similar to those reported for the samples. Review of the data suggests that the presence of phthalates was a result of sample contamination. Phthalates are not thought to be present in the groundwater. The performance of the laboratory was satisfactory.

#### 5.0 DISCUSSION OF RESULTS

##### 5.1 Groundwater

Water samples from 12 locations were analyzed for a variety of parameters. None of the organic chemicals analyzed for were found in four of the wells. Of the remaining locations four had only one compound, two had two compounds and two had three compounds. No concentrations were over 50 ug/L (ppb). Vinyl chloride was found at only two locations, sites E1 and F1. Concentrations were 41.6 and 38 ug/L respectively.

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The results were compared with the results of the 1984 report. In general, the agreement of the groundwater quality parameters was found to be good. Significant decreases in the concentrations of chemicals were found in wells C2, D1, F1 and F2. Well C2 went from 50 ug/L to 18 ug/L of 1,1,dichloroethylene; well D1 went from 160 ug/L 1,1-dichloroethylene to 15 ug/L, from 24 ug/L trans-dichloroethylene to non-detectable; well F1 went from 130 ug/L trans-dichloroethylene to 22 ug/L, from 140 ug/L trichloroethylene to 38 ug/L; and well F2 went from 200 ug/L trans-dichloroethylene to non-detectable and 50 ug/L trichloroethylene to non-detectable. Sites A1 & A2 showed a small increase in the concentrations of some chloroethylenes. The concentrations of trans-dichloroethylene and vinyl chloride in E1 slightly increased to 161 ug/L and 42 ug/L, respectively. The changes do not indicate a strong source of chemicals in the vicinity of the wells. They do suggest a weak and variable effect from a remote source. Vinyl chloride is though to be produced by degradation of trichloroethylene.

A comparison of the concentrations of volatile chemicals obtained from bailed vs. pumped samples is shown in Table 5.1. The table also includes a comparison of ETC and OCC volatiles data for some of the wells. The comparison of ETC and OCC results showed excellent agreement. The bailed vs pumped results were variable, no effect was observed in the case of well F1, while pumping reduced the concentrations observed in E1. This limited data base makes it impossible to draw a firm conclusion relative to the merits of these sampling techniques.

During phase one, some chromatographic peaks were observed in the volatile scans for some wells. The cause of these peaks was not identified. Similar peaks were observed by OCC during the phase two analyses. They were also observed in blanks and standards analyzed immediately after samples. The mass spectra obtained did not represent compounds present in the water. It appears that these peaks are artifacts caused by column degradation. Unknown peaks were not present in the semi-volatile extracts of these samples.

## 5.2 Therminol Spill Area

Aroclor was detected above 50 ppm in the upper most samples at three locations, S, U and V and in the 3 foot depth sample at site S.

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These sites seem to be close to the limit of the therminol spill, but further sampling will be required to fully define the limit. The inherent variability of soil samples is the best explanation for the difference between the ETC and OCC results for the uppermost sample at site U. It may also show that average concentration is lower than 1800 ppm.

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